

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

WORLD PROGRESS



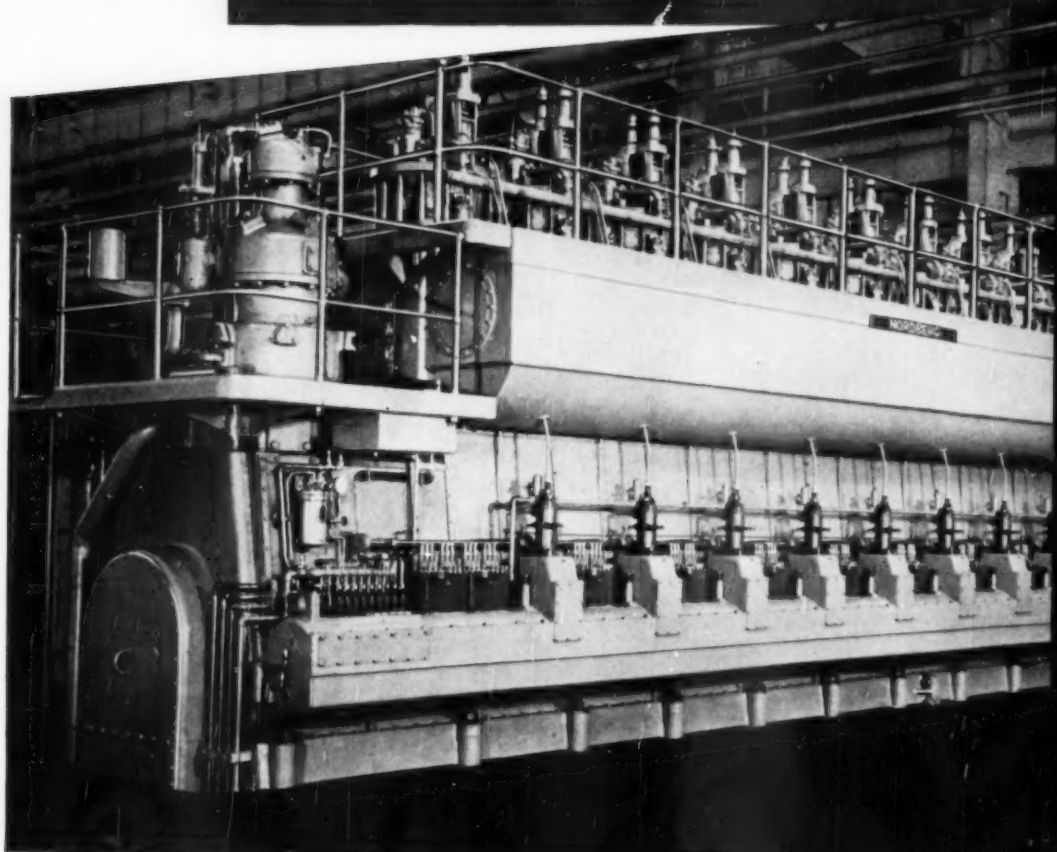
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EFFECTIVE REDUCES 2




TUNE IN . . . TEXACO
presents MILTON BERLE
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TEXACO

DIESEL PROGRESS, for March, 1950, Volume XVI, Number 3. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 816 No. La Cienega Blvd., Los Angeles 46, Calif. Rex W. Wadman, President. Subscription rates: \$5 per year, single copy 50c. Acceptance under 34.64, P. L. & R., authorized.

LUBRICATION VITAL EXPENSES

 **Use Texaco Ursa Oils and save
on fuel consumption and upkeep costs**

*When you lubricate your Diesels
with Texaco Ursa Oils you can be sure of —*

- | | |
|---|--|
|  free rings |  better compression and
combustion |
|  freedom from harmful car-
bon, sludge, varnish |  longer life for bearings
and all moving parts |

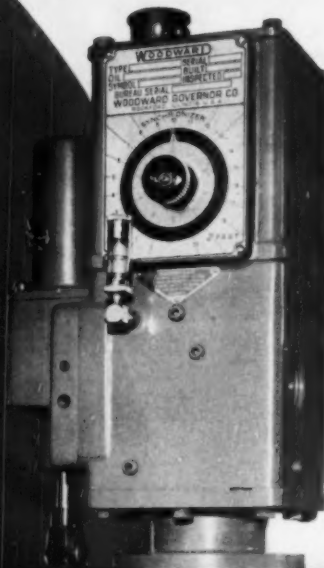
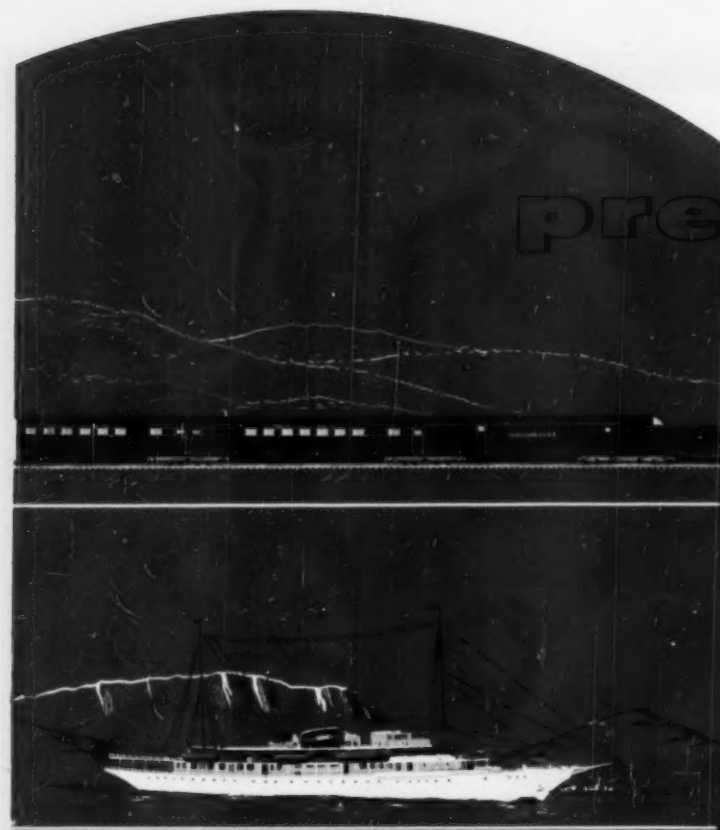
You get these benefits because *Texaco Ursa Oils* are especially made for Diesel lubrication, have exceptional resistance to oxidation, exceptional ability to stand up under high temperature and pressure. Dollar-wise, they assure you the trouble-free, full power performance that means savings in fuel consumption and reduction in maintenance costs.

There is a complete line of *Texaco Ursa Oils*. They are approved by leading Diesel manufacturers and — *more stationary Diesel b. p. in the U. S. is lubricated with Texaco Ursa Oils than with any other brand!*

Step up your Diesel efficiency and step down your costs. A Texaco Lubrication Engineer will gladly help you. Just call the nearest of the more than 2,000 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, New York.

URSA OILS · **FOR ALL DIESEL
ENGINES**

precision



WOODWARD Type PG Hydraulic Governor

The name "Woodward" on a governor indicates precision. It indicates precise application of known requirements and conditions to the design of the governor . . . precise manufacture to insure accuracy of regulation for many years . . . precise control of the engine to attain the desired operating goal. This combination produces maximum overall precision in the new Woodward Type PG hydraulic governor. •

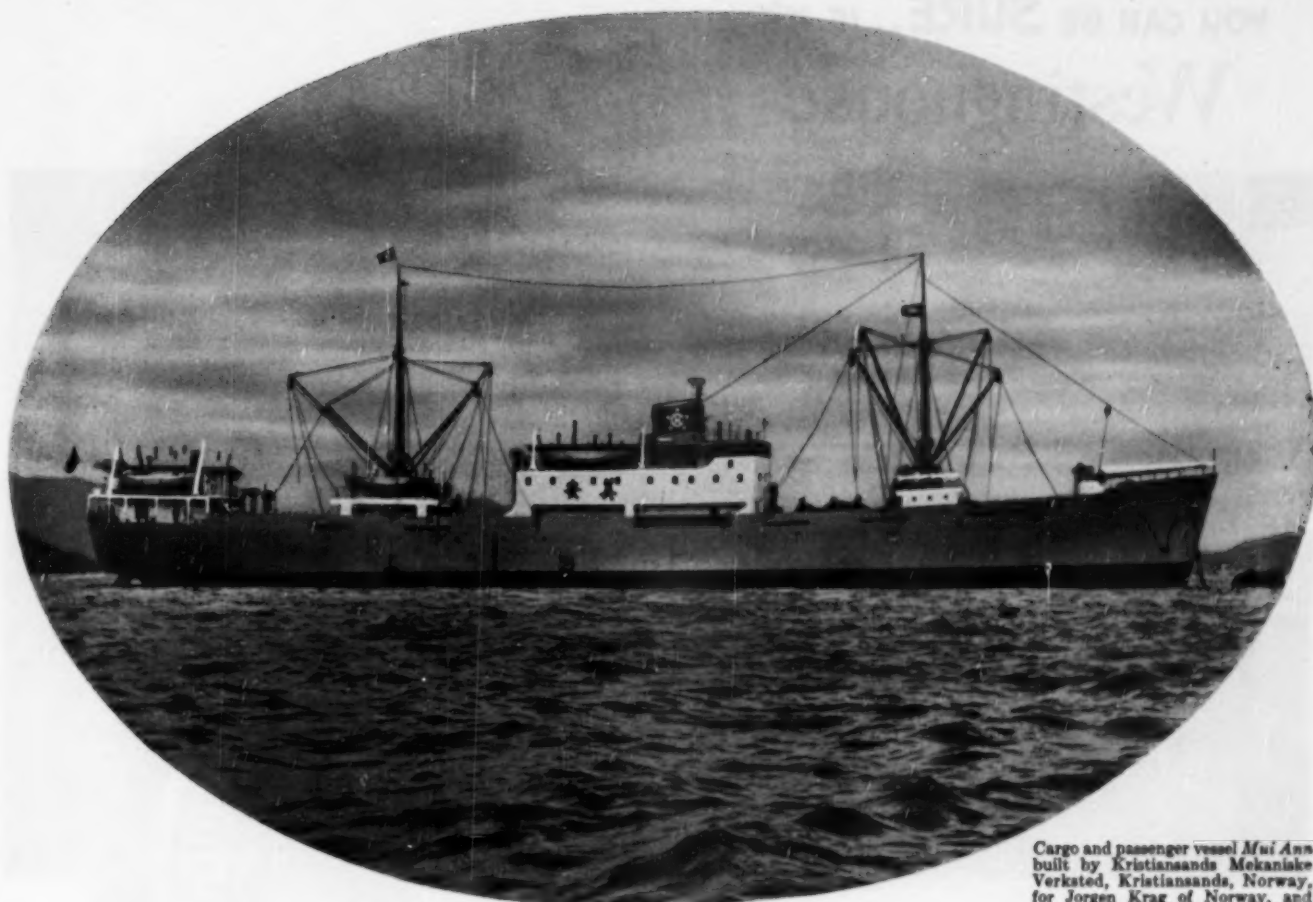
WOODWARD GOVERNOR COMPANY

ROCKFORD, ILLINOIS

World's oldest and largest exclusive manufacturer of hydraulic governors for prime movers.



DIESEL PROGRESS



Cargo and passenger vessel *Mui Ann* built by Kristiansands Mekaniske Verksted, Kristiansand, Norway, for Jorgen Krag of Norway, and under charter to Ngow Kock Company, Bangkok, Siam.

General Motors Diesel-Electric Drive *Circles The Globe*

From New York to Hawaii, China to Venezuela—all around the world—General Motors Diesel-Electric Drive today provides operating advantages that are constantly broadening the range of application of this type of marine propulsion. Maneuverability, dependability,

economy—these are cardinal features of profitable ship operation which General Motors Diesel-Electric Drive makes available wherever modern ships are used. Notable among recent installations is that in the *Mui Ann* now in service in Chinese waters.



ENGINES FROM
150 TO 2000 H.P.

General Motors Diesel-Electric Drive has powered more than 700 vessels in 22 different classifications.

Leader in Diesel engineering development for 38 years

CLEVELAND DIESEL ENGINE DIVISION

CLEVELAND 11, OHIO

GENERAL MOTORS

SALES AND SERVICE REPRESENTATIVES

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Cleveland Diesel Eng. Div.
General Motors Corp.
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New York 16, N. Y.

WASHINGTON, D. C.
Cleveland Diesel Eng. Div.
General Motors Corp.
504 Hill Building
Washington 6, D. C.

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Walter H. Moreton Corp.
9 Commercial Avenue
Cambridge 41, Mass.

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Curtis Marine Co., Inc.
348 Pratt Street
Norfolk 7, Va.

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Jacksonville 2, Fla.

TAMPA, FLA.
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212 First Street
Orange, Texas

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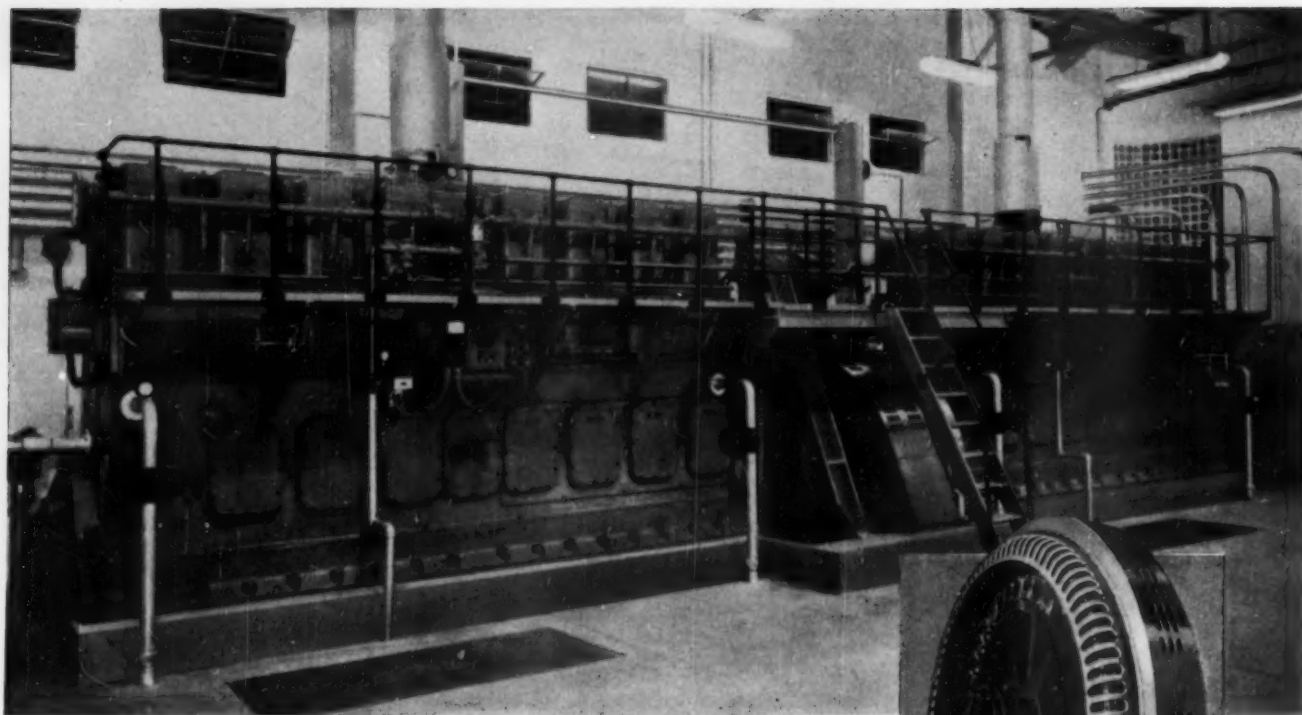
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New Orleans 13, La.

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Evans Engine and Equip. Co.
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Cleveland Diesel Engine Div.
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San Francisco 5, Calif.

YOU CAN BE **SURE**.. IF IT'S
Westinghouse



**What you can't see...the PLUS
added by Westinghouse Engineering**

The only job of those big twin diesels, pictured above, is driving the Westinghouse A-C Generator almost lost in between them. An unusual installation—the first of its kind. Like many firsts, it too, presented problems. Insulating against the flow of shaft currents was one of them. Coupling the shaft looked like the answer—if an insulated coupling could stand up to the terrific driving force of the twins . . . if it lost no torque . . . if it could take it for at least a year without maintenance.

The engine builders asked Westinghouse, suppliers of the generator, to tackle the problem.

Westinghouse engineers designed an insulated coupling that did the job—and more, paving the way for future installations of this type.

This example shows the problem-solving ability offered

by Westinghouse in building special generators for unusual applications.

Make certain you get the benefit of Westinghouse engineering on your next equipment. Power Apparatus Specialists—in principal cities—will help you select and apply the right equipment to the job. Consult them for any present or future plans. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21571

Westinghouse
DIESEL ENGINE DRIVEN
AC GENERATORS

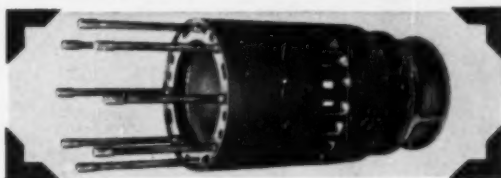


DIESEL PROGRESS

STANDARD ENGINEER'S REPORT

	DATA
LUBRICANT	RPM DeLo Oil R.R.
UNIT	Locomotive Diesel G.M. 567 B
TRAIN	"California Zephyr"
SERVICE	San Francisco-Salt Lake
FIRM	Western Pacific R.R. Co.

Only 0.002 inch cylinder wear in 1/2 million miles!



515,720 MILES WITHOUT REPLACEMENT of a single part was the record for all 48-cylinder assemblies in a "California Zephyr" diesel locomotive when this one was pulled for inspection. Lubricated with specially compounded RPM DELO Oil R. R., the engines stay in continuous service a full million miles without time off for overhaul!



NO RING TROUBLE or lacquer deposit problems have been encountered in this long service, as this unretouched photo of the piston indicates. The cylinder "miked" only 0.002 inch taper and 0.005 inch out of round.



WRISTPIN BUSHING IN PERFECT CONDITION! Measurement proved the bushing was still "standard" after the more than 1/2 million miles of service! RPM DELO Oil R. R. will not corrode silver bushings. All parts were put back in service.

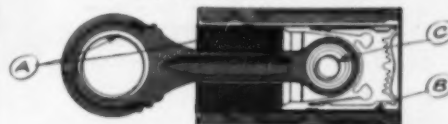


Trademark "RPM DELO" Reg. U. S. Pat. Off.



"THE CALIFORNIA ZEPHYR," new streamliner with Vista-Dome cars, runs daily both ways across the continent. Only 3 diesel locomotives keep it on schedule between San Francisco and Salt Lake.

How RPM DELO Oil R. R. prevents wear, corrosion, oxidation



- Special additive provides metal-adhesion qualities . . . keeps oil on parts whether hot or cold, running or idle.
- Anti-oxidant resists deterioration of oil and formation of lacquer . . . prevents ring-sticking. Detergent keeps parts clean . . . helps prevent scuffing of cylinder walls.
- Special compounds stop corrosion of any bushing or bearing metals and foaming in crankcase.

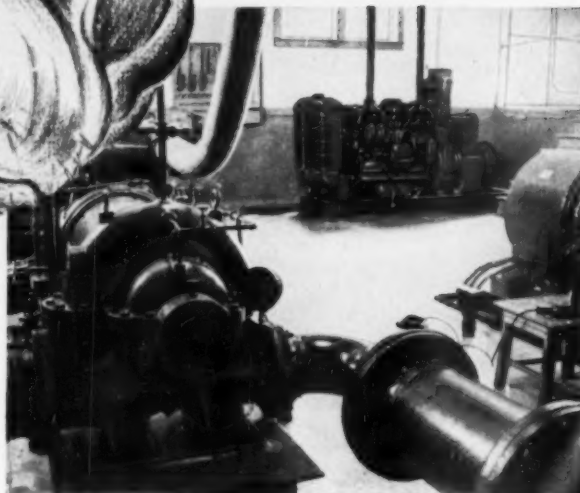
FOR MORE INFORMATION about this or other petroleum products, or the name of your nearest distributor, write or call any of the companies listed below.

STANDARD OIL COMPANY OF CALIFORNIA • San Francisco
THE CALIFORNIA OIL COMPANY • Barber, N.J., Chicago, New Orleans

STANDARD OIL COMPANY OF TEXAS • El Paso, Texas
THE CALIFORNIA COMPANY • Denver, Colorado



An International UD-18A diesel and generator is the standby unit for the Battle Creek, Michigan, water supply. In case of power failure this unit provides enough power for electric pumps on 15 of the 22 wells in Verona, source of the city's water supply.



Get International Power Units, with matched generators to stand guard against power failure. A sturdy, dependable standby that never sleeps, the International diesel engine is always ready, at a moment's notice, to take over when emergency strikes or to add its power whenever excessive loads demand it.

Your International Power Unit Dealer is ready to supply the "sentry" that will exactly fit your needs. See him for standby generating equipment, or for power units for any other application. Be sure of *dependable* power protection with International power units.

INTERNATIONAL HARVESTER COMPANY • Chicago

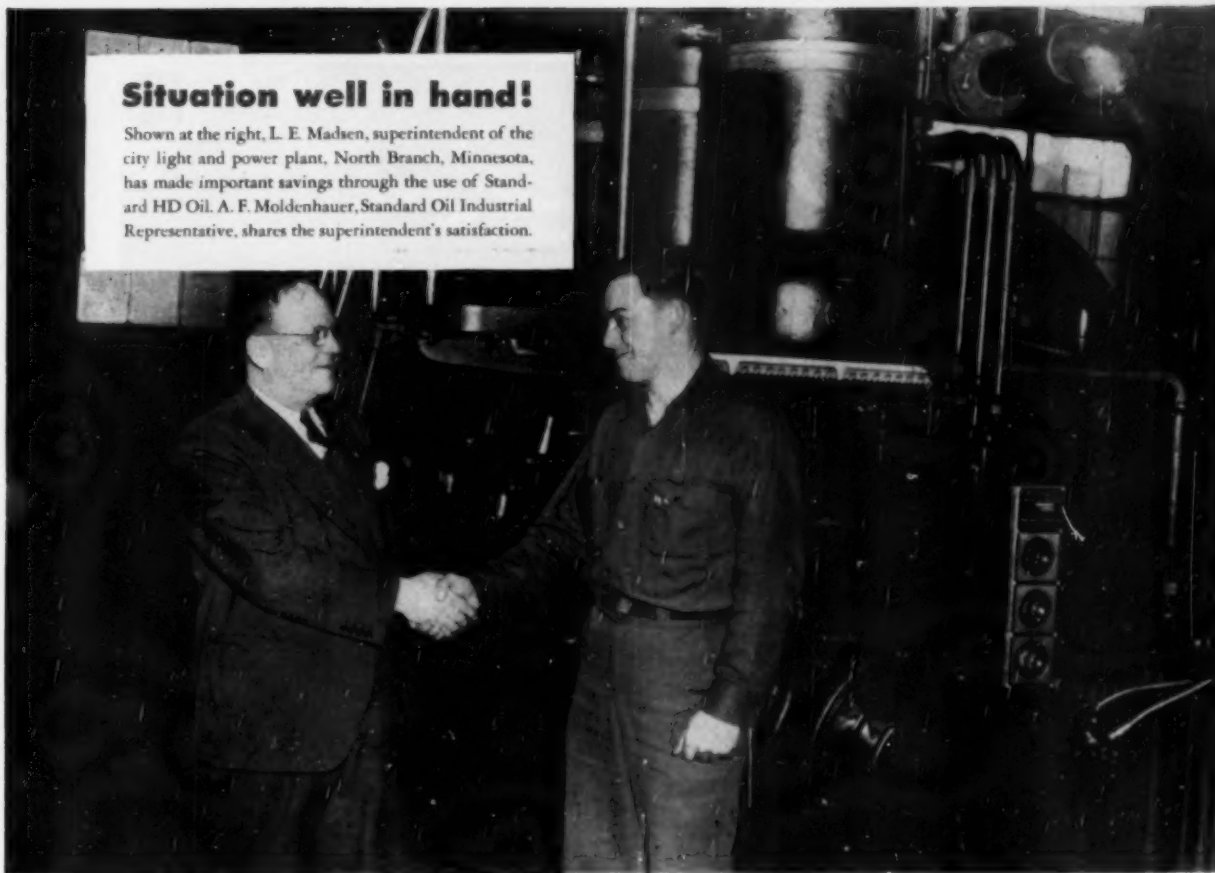
**CRAWLER TRACTORS
WHEEL TRACTORS
DIESEL ENGINES
POWER UNITS**



**INTERNATIONAL
INDUSTRIAL POWER**

Situation well in hand!

Shown at the right, L. E. Madsen, superintendent of the city light and power plant, North Branch, Minnesota, has made important savings through the use of Standard HD Oil. A. F. Moldenhauer, Standard Oil Industrial Representative, shares the superintendent's satisfaction.



Operation improved 3 ways with ...

HERE'S WHAT the switch to Standard HD Oil, formerly Nonpareil HD Diesel Oil, did for a 300-HP Fairbanks-Morse Diesel engine in the city light and power plant, North Branch, Minn.:

The engine was operated for 3,000 hours on Standard HD. An inspection of the unit and a comparison of lubrication records showed three important improvements brought by Standard HD. *Piston deposits, previously heavy, had been reduced to negligible quantities. Life of filter cartridges had been doubled—increased from 90 days to 180 days. Lubricant consumption had been cut by 22%.*

You can count on getting similar benefits from using Standard HD Oil. This superior lubricant has shown, again and again, that it can improve economy in all types of Diesels and in all kinds of service. It owes that ability to the combination of effective oxidation-resistant and detergent additives with

STANDARD HD OIL

FORMERLY NONPAREIL HD DIESEL OIL

highest-quality base stocks. A Standard Oil Lubrication Engineer will help you obtain the most effective use of Standard HD Oil. Why not write for his services, today?

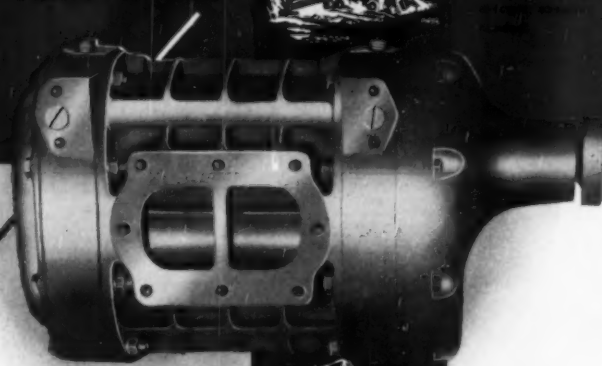
Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA)



**UP TO 45%
MORE HORSEPOWER**

... from the same engine



...with a B-W Supercharger

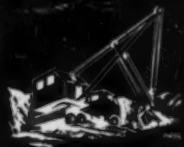
When you need more power, without additional weight, and installation space is limited . . . when altitudes are high and engine power diminishes . . . when the going is uphill, and tough . . . those are the times when you need the help of a B-W Supercharger.

Without an appreciable increase in engine space requirements, a B-W Supercharger greatly increases engine performance and flexibility because it delivers more air to the cylinders than the pumping action of the pistons would normally draw in. It's that simple . . . yet this simple principle means up to 45% MORE power from the engine! And that means smaller original investment, savings in fuel.

Over 10 years of trouble-free performance in the field have proved the leadership of B-W Superchargers. They are de-



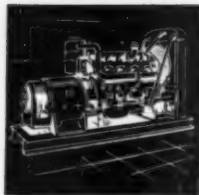
For greater flexibility and engine economy, suitable for the highest peaks.



High capacity built to meet the demands of the most exacting industrial and marine conditions.



For work boats, industrial locomotives, etc., superchargers save space and fuel.



For Diesel generating plants, B-W Superchargers provide maximum performance and flexibility.

signed and built in both sleeve bearing and antifriction bearing type . . . the sleeve bearing type being lubricated from the engine.

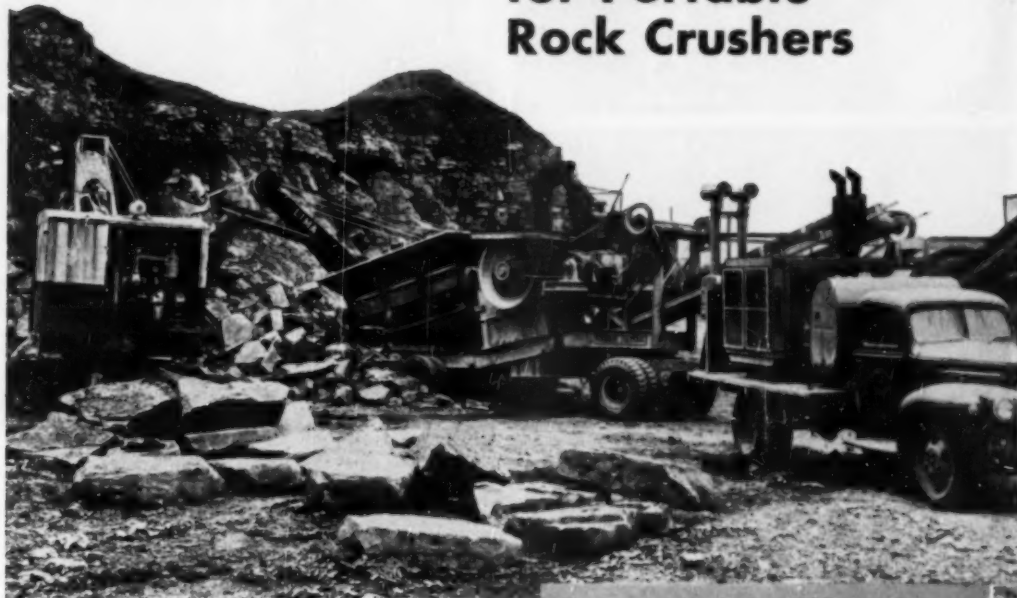
For complete information . . . and for the full story of what B-W Superchargers can do for your Diesel or gasoline engines, write today.



BORG-WARNER CORPORATION
24700 NORTH MILES ROAD BEDFORD, OHIO

Best Power there is

for Portable Rock Crushers



THAT'S what hundreds of operators like B. L. Anderson of Cedar Rapids, Iowa, are saying about General Motors Series 71 Diesels—and with good reasons.

GM Diesels pack lots of rugged power, yet their sensible size and weight make them easy to move and simple to set up. Efficient factory-built multiple engine units are available. Virtually every power need can be filled.

ALL GM Diesels are 2-cycle, with power at every piston downstroke. They're smooth-operating—easy to start on their own fuel—and quick to respond when picking up a load.

A truck-mounted GM Diesel Twin Six drives the 48" hammermill, a single six powers the 30" x 36" jaw crusher on this Cedar Rapids portable unit, one of two GM Diesel-powered plants operated by B. L. Anderson in eastern Iowa. Each plant averages 130 tons of 34" road rock per hour. Operating 18 GM Diesel engines in various pieces of equipment, Anderson has lost only one day's operation in three years due to engine failure.

These qualities are important in any rock-crushing operation. So it's certainly worth while to get full information on these hard-working, easy-to-maintain 2-cycle Diesels. Drop us a line and we'll see that you get it.

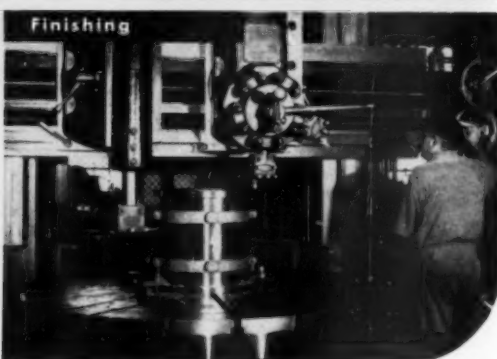
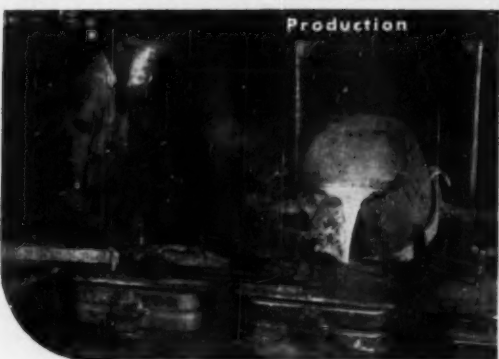
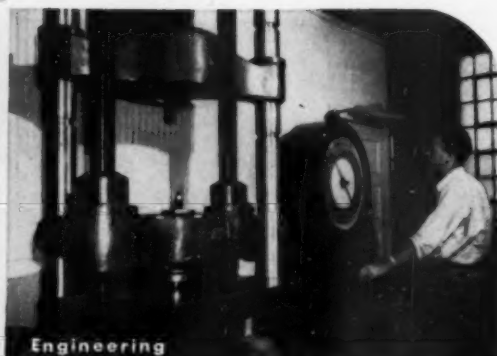
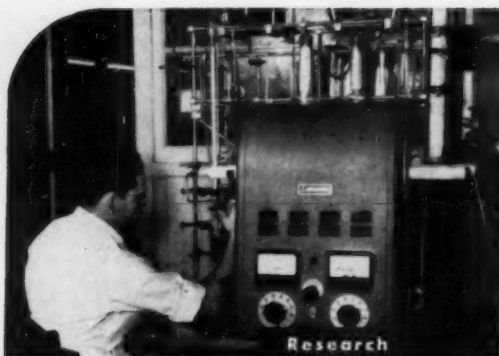
DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES... Up to 200 H. P. DETROIT 28, MICHIGAN MULTIPLE UNITS... Up to 800 H. P.

GENERAL MOTORS

DIESEL BRAVN WITHOUT THE BULK





WHICH

N.B.M. service is most important FOR PRODUCING BETTER BRONZE BEARINGS AND CASTINGS?

The answer is that **ALL FOUR** are equally important... and **ALL FOUR** represent the reasons why more and more users of Non-Ferrous Bearings and Castings become N-B-M Customers.

The complete facilities of National Bearing Division for Research, Engineering, Production and Finishing are unique. They represent an important *chain of service*—an ability to translate your *problems* into *requirements*, and requirements into *actual products* that serve you better.

The most modern equipment for alloy testing, molding, casting and finishing assures you of finer, more dense, closer-to-size bearings and castings—products that have higher resistance to wear and greater long-range economy.

Yes, this complete N-B-M Service is worthwhile investigating. Call in your nearest N-B-M Representative—he will gladly show you how this service can be geared to serve you with maximum efficiency.



THIS NEW CATALOG completely describes N-B-M Facilities—how they can cut costs for you and tie in with your own production. Write for a free copy today.



AMERICAN

Brake Shoe

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NATIONAL BEARING DIVISION

4930 Manchester Avenue • St. Louis 10, Mo.

PLANTS IN: ST. LOUIS, MO. • MEADVILLE, PA. • NILES, OHIO • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

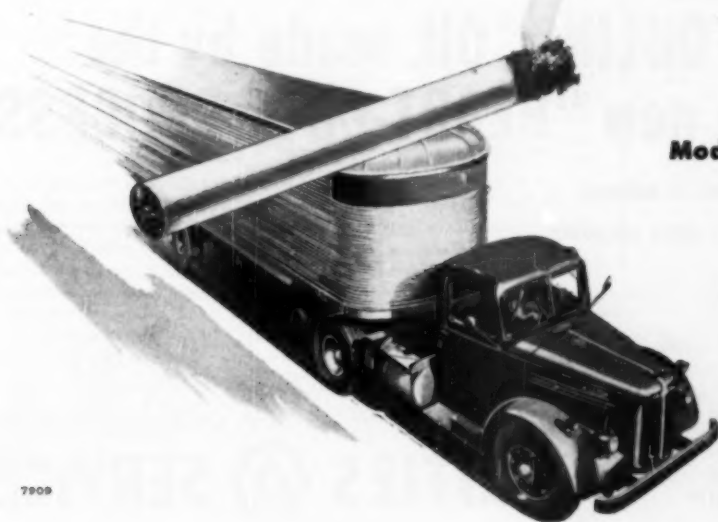
Only the Driver Smokes

ON A MACK DIESEL

• That's his privilege—cargo permitting. But no Mack diesel engine can smoke on the job. We see to that—with such proven features as the Mack *Synchrance* for fully automatic injection timing at all engine speeds—plus numerous other exclusive Mack developments that give controlled fuel distribution and controlled combustion.

All team up in Mack diesel engines to provide combustion that is truly smokeless... to give the utmost in engine efficiency. All combine to promote smoother running, greater engine flexibility, maximum fuel savings.

Next time you see a diesel-powered truck on the highway, check for yourself. Where there's *no* smoke—it's a Mack diesel.



Modernize with



Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

7909



(Partial view of the enormous new lubricating oil plant at Lake Charles, La., where this great new oil is processed.)

"ANTI-FOULING" OIL made by the Remarkable new "HEART-CUT" PROCESS

This new oil—the best known to science... gives you a cleaner engine...more economy...minimum carbon residue.



It's here now! The remarkable motor oil from the giant new \$42,000,000 lubricating oil plant at Lake Charles, La. The plant that's been the big talk of the oil industry for months.

New Premium Koolmotor is made by the unique "Heart-Cut" Process which retains only the choicest part of the finest crudes. *It's so superior that in recent engine tests it outscored nine other major premium motor oils.* No wonder Premium Koolmotor is better in every way! Cleans better, seals better, cools better and fights acid, sludge and corrosion far more effectively. Switch to this remarkable new oil today.

start saving Dollars today...stop at

CITIES  SERVICE

For resistance to frictional wear...



GUN IRON CASTINGS

If there are cast wearing parts in your products or equipment, it will pay you to investigate the advantages of Gun Iron. Since its original development over 139 years ago, Gun Iron and its alloys have proved superior for wear resistance on literally thousands of different applications.

Taking one industry as an example, Gun Iron is used for steam locomotive cylinder and valve packing rings and bushings, cross-head shoes and rod bushings to name a few. On all of these, friction is extremely severe due to irregular lubrication. Because of the exceptional performance of Gun Iron, it is specified for these parts by most leading engine manufacturers and railroads.

Gun Iron is produced in air furnaces similar to steel open hearth furnaces and has a dense, close-grained, 100% pearlite micro-structure with an even distribution of flake graphite throughout. It also has exceptional resistance to high heat, impact, corrosion and erosion and damps vibration more effectively than other irons. Our engineers and metallurgists are at your disposal to discuss the application of Gun Iron to your strategic cast parts . . . our furnaces, foundry and extensive machining facilities stand ready to produce them accurately and economically. Why not write for more details today?

GUN IRON *in the* DIESEL FIELD

Hunt-Spiller casts and machines many important diesel parts for leading diesel engine manufacturers. A few are listed below:

MAIN CYLINDER LINERS • CYLINDER HEADS • PISTONS AND H-S DOUBLE SEAL RINGS • WATER JACKETS • PRESSURE CASTINGS

Chances are that there are many other places where Gun Iron can solve a design or operating problem. To help you determine the value of Gun Iron for your cast parts, our metallurgical department has prepared a comprehensive bulletin which contains complete properties and discussions of Gun Iron and many other metals. Engineers claim it an invaluable reference aid. Send for your free copy today.



HUNT • SPILLER MANUFACTURING CORPORATION

387 DORCHESTER AVENUE • SOUTH BOSTON 27, MASS.

Canadian Representatives: Joseph Robb & Co., Ltd., 4750 Hamur St., Montreal 14, P. Q.

It's **EASY** to install "Payroll Savings"

... and 20,000 companies' experience proves it pays!

If you've put off installing the Payroll Savings Plan in your company because you feel it would be "a lot of work," then this advertisement is certainly for you! Because it's really very simple to give your employees the advantages of investing in U. S. Savings Bonds the easy, automatic "Payroll" way.



HERE'S ALL YOU NEED TO DO

Appoint one of your top executives as Savings Bond Officer. Tell him to get in touch with your State Director, Savings Bonds Division, U. S. Treasury Department. Here's what happens...

The State Director will provide application cards for your employees to sign—plus as much promotional material and personal help as necessary to get the Plan rolling in your company.

Those employees who want Savings Bonds indicate on the applications: how much to save from their pay; what denomination of Bonds they want; and the inscription information to appear on the Bonds.

Your payroll department arranges to withhold the specified amounts, arranges to get the Bonds, and delivers them to the employees with their pay.

The Bonds may be obtained from almost any local bank or from the Federal Reserve Bank or may be issued by the company itself upon proper certification by the Federal Reserve Bank or Branch in the company's District.

THAT'S ALL THERE IS TO IT!

In case you're skeptical as to how many of your employees would like to have Payroll Savings, canvass your plant—and be prepared for a surprise. (Remember that pay-check withholdings for Bonds are *not* a "deduction"—the employee takes home his Bonds with his pay.) One leading manufacturer, who had professed little faith in the Plan, found his eyes opened when he asked the people in his plant whether they would like to obtain Bonds in this way. Within only six months after he installed the

Plan, half his employees signed up. A prominent aircraft manufacturer, whose company had used the Plan for some time, was not aware of its potentialities until his personal sponsorship increased participation by 500% among his company's employees.

THE BENEFITS ARE BIG— FOR EVERYONE

The individual employees gain security—they know that the Bonds they hold will return \$4 for every \$3 at maturity. The company gains from

the resultant increased stability and efficiency of its workers. The whole nation gains because Bond sales help stabilize our economy by spreading the national debt and by creating a huge backlog of purchasing power to boost business in the years ahead.

Is it *good* policy to deprive your company of Payroll Savings—even one more pay day? Better at least have a talk with your U. S. Savings Bonds State Director, get the answers to your questions, and *know for sure*.

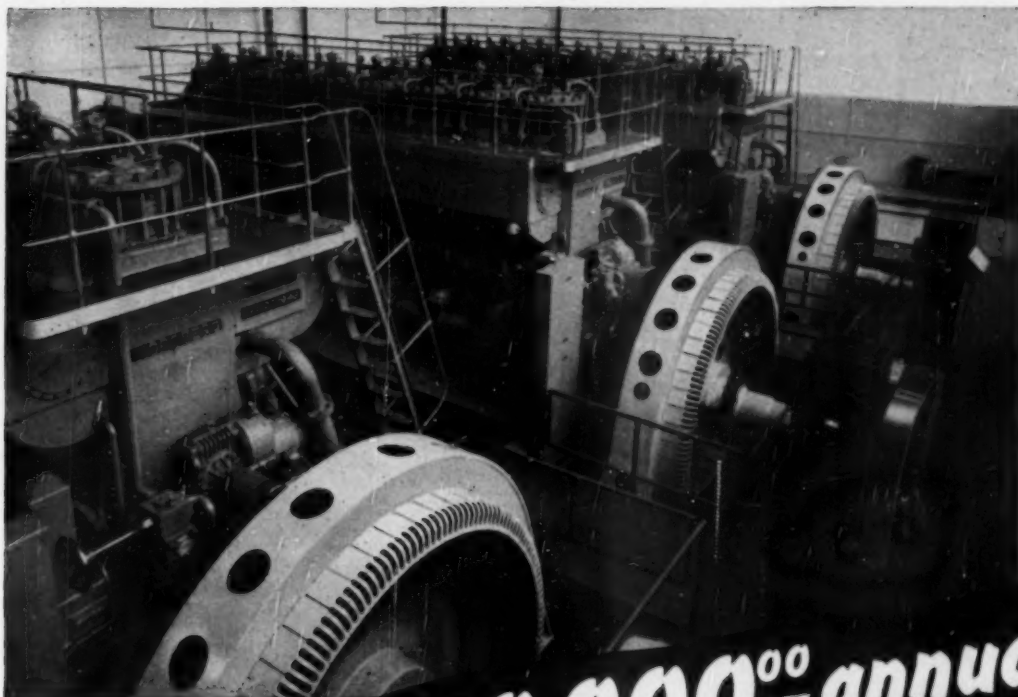
The Treasury Department acknowledges with appreciation the publication of this message by

By H. T. Adams

Editor—DIESEL PROGRESS



This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.



**saving \$150,000⁰⁰ annually
with NORDBERG Diesel Power**

**THREE 3200 H. P. NORDBERG DIESELS
SERVE MODERN PLANT AT PEABODY, MASS.**

Here is another progressive municipality that has turned to Nordberg Diesels as the solution for its power problems. Since 1891 Peabody has maintained a steam generating station, but as is so often the case, this became outmoded with time and incapable of meeting today's demand for adequate power at low cost. The three Nordberg Diesel generating units now serving Peabody have ample capacity for the city's expanding electric service requirements, furthermore the plant will show a saving in excess of \$150,000.00 a year — more than is necessary to liquidate the bonded indebtedness and take care of insurance, wages, maintenance and depreciation.



The new municipal power plant at Peabody, Mass., built at a cost of \$1,218,000.00, is most modern in every detail. The three big Nordberg Diesels in this plant develop a total of 9600 H. P.

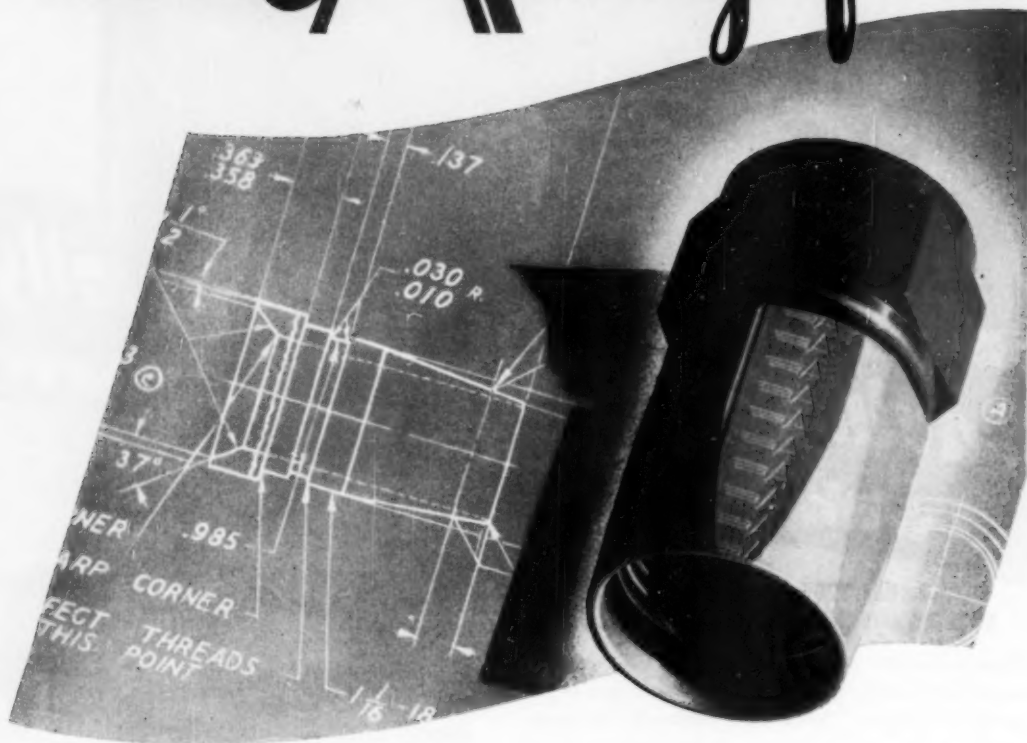
Nordberg Diesels are built in sizes up to 8500 H. P., in two and four-cycle types, including both oil and gas burning models. Write for details covering a unit to meet your specific requirements.

NORDBERG MFG. CO., Milwaukee 7, Wisconsin

P250



Always first



Conceived **FIRST**, developed **FIRST**, produced **FIRST**. This is the undeniable record of AEROQUIP DETACHABLE, REUSABLE HOSE FITTINGS. Industry was quick to accept this new and original "Aeroquip Idea." Not only did industry adopt the "Aeroquip Idea," other manufacturers jumped headlong into the manufacture of products they hoped to substitute for Aeroquip Fittings. Imitation is the best form of flattery, but Aeroquip design and quality have never been equalled.

AEROQUIP CORPORATION

JACKSON, MICHIGAN

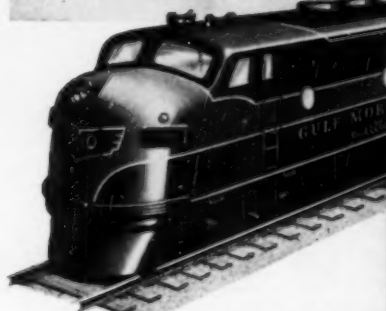
SALES OFFICES: 1053 NO. HOLLYWOOD WAY, BURBANK, CALIF. 1215 SO. EAST GRAND AVE., PORTLAND 14, ORE.
AND WAREHOUSES: 2912 N. E. 28TH ST., FORT WORTH 11, TEXAS 72-74 STAFFORD STREET, TORONTO, CANADA
SAME OFFICES: 303 WAREHAM BLDG., HAGERSTOWN, MD. 1419 2ND AVE., SO., MINNEAPOLIS 4, MINN.

AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U. S. A. AND ABROAD



GONE are the "good old days" when this rococo palace car was tops in traveling elegance. Gone too are the smoke and cinders that made railroad travel in those days a bit grimy to say the least; and you couldn't read long at a time because of the train's jolts and jerks. You just had to sit and take it.

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GENERAL MOTORS—LA GRANGE, ILL.

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Don't take another load away in your engine...

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*Reg. U. S. Pat. Off.

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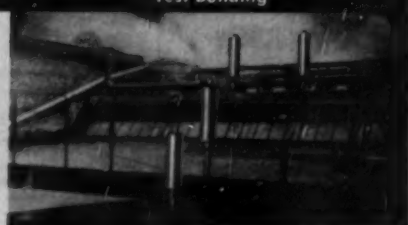
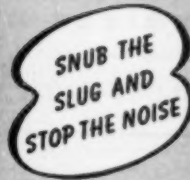
Tug



MANUFACTURING

Compressed Air System

Test Building



PETROLEUM

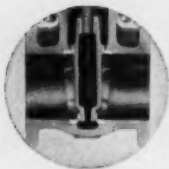
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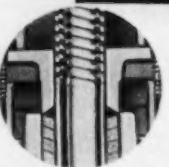
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Seat Rings of end-seated type are screwed into the body.



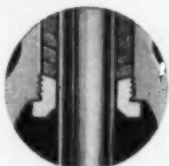
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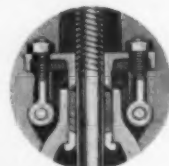
Bronze Back-Seat Bushings in bonnets of OS&Y valves.



Solid Web Type Disc in OS&Y valves for greater strength and longer service.



Hinged Gland Eye-Bolts on OS&Y valves permit faster, easier repacking under full pressure.



WALWORTH iron body gate valves with screwed or flanged ends



For complete information on these new Walworth Iron Body Valves, see your local Walworth distributor, or write for bulletin 106.

8 Outstanding Features

WALWORTH valves and fittings

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View of the recently enlarged and modernized Union Oil Avila terminal on the California Coast near San Luis Obispo.

Moving Crude from Tanks to Tankers

- one-third faster!
- at 20% of former fuel requirements!

Getting down to brass tacks, there's nothing like *performance* to prove the point on power equipment. That's just what Union Oil's three new Enterprise Diesels are doing at their Avila pumping station. Figures show a reduction of tanker loading time by one-third—coupled with an overall saving of 80% to 90% over former fuel requirements. Rated 20,000 B/H capacity, here's a typical loading operation at Avila that's hard to beat for cost-saving, time-saving efficiency:

S.S. Lompoc—June 15-16, 1949

Drop anchor 5:20 p.m.; discharge 2300 B ballast; discharge 3,000 B gasoline; load 116,000 B 31 gr. crude, 80°F.; on hose 6 hrs., 50 min.; up anchor 1:40 a.m.; average 17,058 B/H—best 4 hr. average 20,030 B/H!

The flexible, dependable power offered by Enterprise Diesels may well point the way to more profitable pumping operations in your plant or station. Enterprise engineers will be glad to assist you in any way they can. A prompt reply will be given your call, letter or wire.

These three model DGS-6 Enterprise Dual Fuel Engines, rated 460 BHP at 450 RPM, are designed to provide the most efficient service in variable load, variable speed pumping station work. At the Avila Terminal, for example, speeds normally vary from 325 to 450 RPM and from 1/4 to full load in intermittent use. Full information on this and other Enterprise Engines in the complete range of models up to 1800 BHP per unit, will gladly be furnished on request.

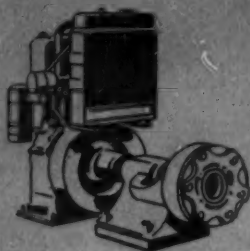
ENTERPRISE Diesels



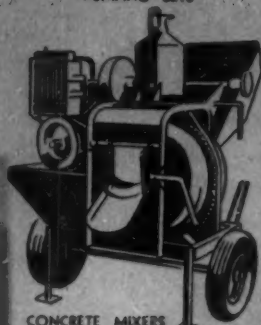
ENTERPRISE ENGINE & FOUNDRY CO.
18TH & FLORIDA STS., SAN FRANCISCO 10, CALIF. OFFICES IN PRINCIPAL CITIES



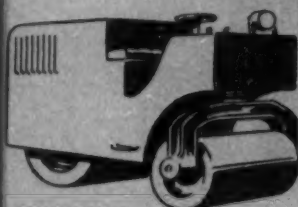
COMPRESSOR SETS



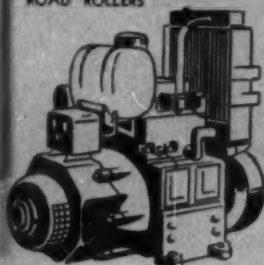
PUMPING SETS



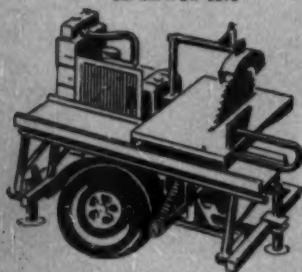
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NOW! A DIESEL AT GASOLINE ENGINE PRICES!

For Compressor drives, Pumping units, Road Rollers, Tractors, Stone Crushers, Concrete Mixers, Saw Benches, Refrigeration Machinery and a myriad of power applications you can now have—

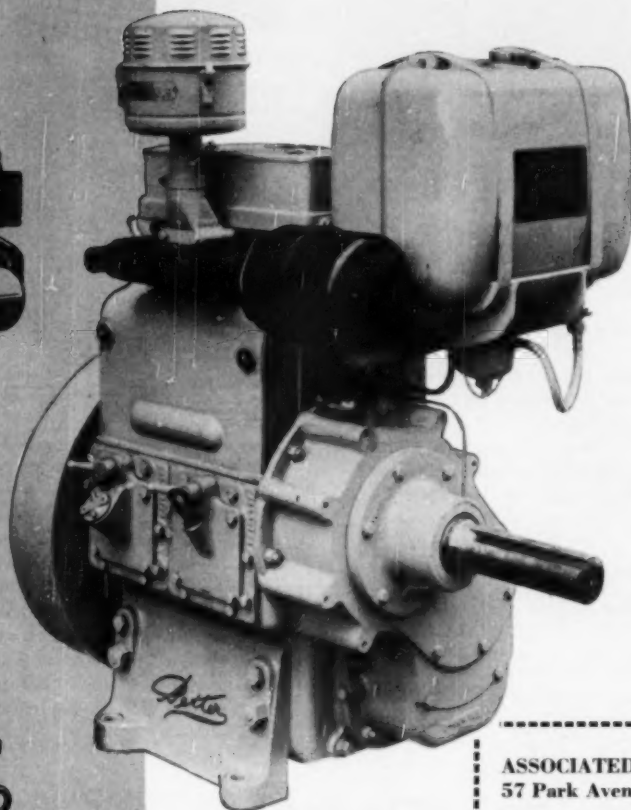
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Diesel Dependability

Diesel Ruggedness and long life
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- ★ Petter's distributors throughout the country will maintain service facilities and parts at correspondingly low cost.
- ★ Petter Diesels cost less to operate than other types and run for 25 per cent of the cost of Gasoline engines.



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57 Park Avenue, New York 16, N. Y.

Please send without obligation complete information and prices on the Petter Diesel.

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TYPE OF BUSINESS _____

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DIESEL and GAS ENGINE PROGRESS

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

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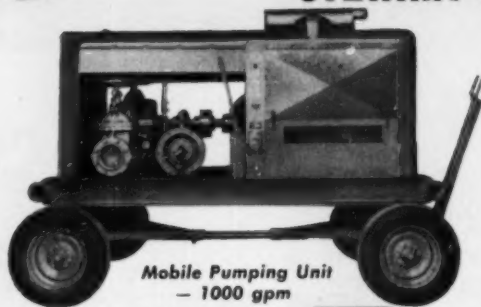
FRONT COVER ILLUSTRATION

The New Harbor at Los Angeles Bay near Port of Long Beach, Calif. A new harbor which has an active future and fishing fleet.

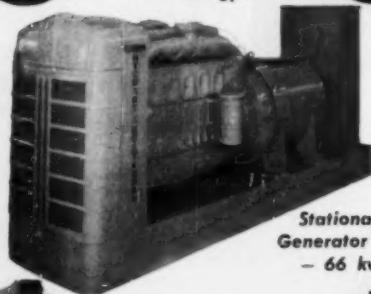
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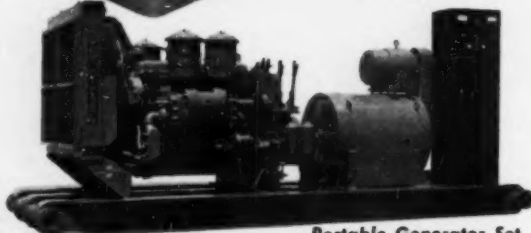
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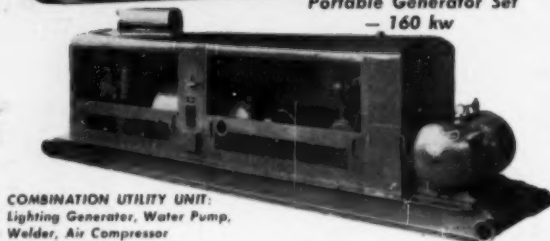
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— 1000 gpm



Stationary
Generator Set
— 66 kw



Portable Generator Set
— 160 kw



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Welder, Air Compressor

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PARTS...
SERVICE



THE NATION'S LARGEST DISTRIBUTORS OF GM DIESEL ENGINES

DIESELS DO A FARM STRIP TEASE!

**Ex-Marine's Palouse County Ranch Gets Soil Conservation "Farm-in-a-Day" Treatment
by 121 Pieces of Tillage and Earth Moving Equipment as 10,000 Farmers See Show**

By F. HAL HIGGINS

THE famous old Palouse farming area of eastern Washington and western Idaho recently showed the world how to dieselize the "Conservation Farm-in-a-Day" program and get a bigger job done faster via diesel tractors. The Palouse country is famed over the past 60 years and more as a wheat farming area that stands on edge so steeply that the "skimmers" in the "mule trains" that pulled combines, plows, seeders, and freighting wagons used the ruggedest language

of any drivers in the world. This first conservation farm face lifting in the West was a huge success in spite of weather that turned wet to stop the smaller non-diesel equipment that appeared from neighboring farms and dealers.

Way back in the "Gay '90's," over a half century ago, the Palouse country began getting its first horse- and mule-drawn combines that were so spectacular that only those who saw them believed

the tales of horsemanship the wheat harvest annually developed with a 30 to 40 horse and/or mule teams as power. Diesel tractors began going into the Northwest farming system immediately after they began coming off the factory line in 1931. Farming was dragging the bottom with wheat farmers edging over the brink of bankruptcy when the diesel tractor appeared to cut the fundamental costs in half and save them from bankruptcy. So, by last September the U. S. Con-

Rolling topography with steel hillsides make control of soil erosion essential for continued cultivation. Bursch farm, five miles southwest of Moscow, Idaho, as it looked the day before the "remaking." Contour guide lines were ploughed in advance to speed operations on the demonstration day.





The Bursch farm is typical of the average Palouse wheat-pea region of Eastern Washington and Northern Idaho—rotary subsoiler on top strip—International diesel tractor.

servation Service was ready to pick a typical Palouse farm for a face-lifting called "Conservation Farm-in-a-Day" to prove to neighboring farmers that the steep farms could and should be farmed in strips with their big crawler diesel tractors pulling wide hitches of rod weeder, duck-foot cultivator, grain drills, etc. Editors, agricultural college engineers, farm machinery dealers, county agricultural agents and farmers attending agreed it was a huge success. And it was done on such a big western scale in the concentration of thousands of horsepower at the fingertips of a few skilled farm tractor operators! All sized and types of farm tractors were present but it was the crawler diesels that put on the main show and furnished the power. The local dealers from the Palouse territory contributed the farm tractors and machines, men and equipment without charge: thirty diesel crawler tractors, eleven smaller wheel tractors, twelve Moldboard plows, six sweep plows, four disk harrows, five heavy disks, six chisels, two rotary subsoilers, one chisel soil saver, one one-way Wheatland disk plow, eight fertilizer

spreaders, two trailers, one jeep, two grain drills. For the heavy construction and road machinery used the bigger farms, logging and construction machinery, dealers of Spokane were called on to supply: one D6 crawler tractor, one six-yard Caterpillar scraper, one TD14 tractor and seven-yard Bucyrus scraper, one D6 and one D7, with bulldozers, one Cletrac 60 with bulldozer, one HD5 tractor with front-lift shovel, one Allis-Chalmers GM diesel motor grader with twelve-foot blade, one Caterpillar diesel motor patrol with 12-foot blade.

The summary of value of work done for the ex-Marine Ralph Bursch in using his farm for a demonstration to thousands of neighbors and visiting farmers and officials from surrounding farming areas for 100 to 200 miles is given in this table by Robert W. Palmer, Work Unit Conservationist, Moscow, Idaho:

The editor of the *Washington Farmer*, who was present and saw the demonstration of diesel engines concentrated on the 200-acre field to do in a single day, reported: "The big crowd saw 121

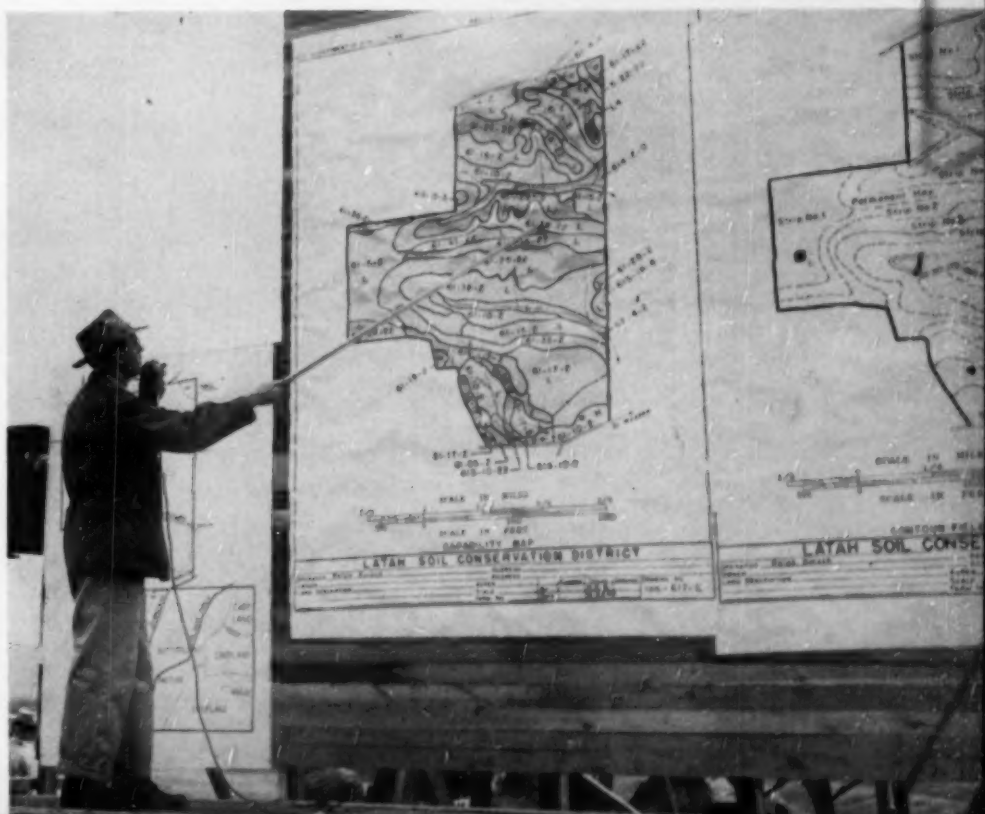
pieces of tillage and earth-moving machinery strip-crop 200 acres, build a 1,450,000 gallon stock water pond, put 5,000 feet of waterways and drainage ditches in shape for grassing next spring, and present scores of tillage demonstrations. Behind the scene, it was a monumental piece of community co-operation, the result of months of planning. Working together were the U. S. soil conservation service, the University of Idaho College of Agriculture, Moscow business men, machinery dealers throughout the Palouse area, farm organizations, and—most important of all—the farmers who brought in and operated their own machinery. The Bursch farm will draw visitors next year because interest in strip-cropping is growing throughout the Palouse. Whether farmers in this big wheat and pea belt will go for this method is a question for the future. Right now, however, they want all the data they can get on how it is done and how it affects harvesting operations. Attendance at the "farm-in-a-day" program clearly indicated this deep-seated interest in strip-cropping. Bursch plans to farm this strip-



Robert Palmer, Soil Conservation Service, explains the farm plan on the Bursch farm during the day.

cropped field on three-year rotation. On this basis, the land will get a shot of sweet clover or alfalfa every third year. "I'm not satisfied with merely holding the land as it is," he says. "I want to build it back up." With that goal in mind, Bursch is planning to expand his livestock operations. Up to now he has had a herd of twenty milk cows, fifty beef cattle, and about sixty-five acres of grass and legume pasture. Next year he will have more of everything. The 5,000-foot grassed waterways and ditches will produce considerable pasture and hay for more livestock.

Farmers came to the show to see the mechanics of strip-cropping. Some will come back late this fall and early next spring to observe how the different tillage methods checked washing. Others will come back for a look when the crops are at their peak. Still others have expressed a desire to see the strips harvested. How does strip-cropping affect harvesting? is their question. In addition to the strip-cropping, the pond building, and the tillage demonstrations, there were scores of individual demonstrations put on by machinery dealers. Just



SUMMARY OF LABOR, SERVICES AND COSTS

	Hours	Cost	Cash Expenditures
Administrative Labor	480	\$ 960.00	
Secretarial Labor (cash outlay).....	240	192.20	\$ 192.20
Committee Labor	760	1,520.00	
Total	1,480	\$2,672.20	\$ 192.20
Field Operations			
Farm Machinery			
9—60 H.P. Diesel tractors and outfits.....	75	\$ 675.00	
22—40 H.P. Diesel tractors and outfits.....	55	1,210.00	
7—20 H.P. tractors and outfits	40	280.00	
11—wheel tractors and outfits.....	30	330.00	
Industrial Machinery			
1—D-6 Caterpillar and bulldozer.....	10	85.00	
1—D-7 Caterpillar and bulldozer.....	10	110.00	
1—Cletrac 60	12	102.00	
2—60H.P. Diesel tractors and scrapers.....	16	192.00	
2—Diesel Auto patrols	22	176.00	
1—HD-5 Diesel tracto-shovel	6	48.00	
Moving Costs (machinery transportation).....		750.00	
	276	\$3,958.00	
Fertilizer (donated—6 ton)		480.00	
Pipe and Fittings (donated).....		40.00	
Petroleum (400 gals. gas; 1,200 gals. Diesel).....		180.00	
Total		\$ 700.00	
Costs of Committee to put on the event totalled.....		\$ 751.60	
BENEFITS TO BURSCH			
	Unit	Cost Per Unit	Amount
Moldboard plow	50 acres	\$1.75	\$ 87.00
Disc, light	50 acres	1.00	50.00
Disc, heavy	40 acres	1.50	60.00
Chisel	37 acres	1.75	64.00
Sweep plow	27 acres	1.50	40.00
Harrow	50 acres
Fertilizer	10 acres	1.00	10.00
Rotary subsoiler	20 acres	1.00	20.00
Wheatland plow	10 acres	1.00	10.00
Drainage ditch	3,100 feet	65.00
Pond, pipe and fittings	1	390.00
Operations Cost			\$ 796.00
Fertilizer			480.00
Total Benefit			\$1,276.00
Bursch's costs—Two tons of fertilizer.....			160.00
			\$1,116.00

about every type of tillage implement already used by Northwest grain growers—or that machinery men would like them to use—was demonstrated. One dealer brought a new type of chisel all the way from Canada to be shown.

Visitors the first week after the big show saw definite results in the stock pond. Water was about 18 inches deep over a 30-square-foot area and steadily flowing in. Bursch's pond is a two-state affair. The dam itself, a 3,400-cubic-yard fill 13 feet high, is in Idaho, but the water filling it is seepage from land across the line in Washington. Wild life is next on the schedule on the Bursch farm remodeling. Ducks and perhaps fish are to be given a chance to make their home in the pond. Bursch has expressed a desire to maintain this land as a practical demonstration of the best in soil handling. That, he feels, is the best way he can repay an obligation to the many farmers who brought their equipment and donated their time and to the others who contributed to the big demonstration."

Full credit is given herewith to the U. S. Department of Agriculture, Soil Conservation Service, for the very excellent photographs that were made available to us for use in this interesting demonstration of planning for more food for more people.

Face of dam taking shape. Ralph Bursch farm pond for livestock being created by Allis Chalmers tractor, International diesel tractor, Caterpillar tractor and an Oliver diesel tractor.



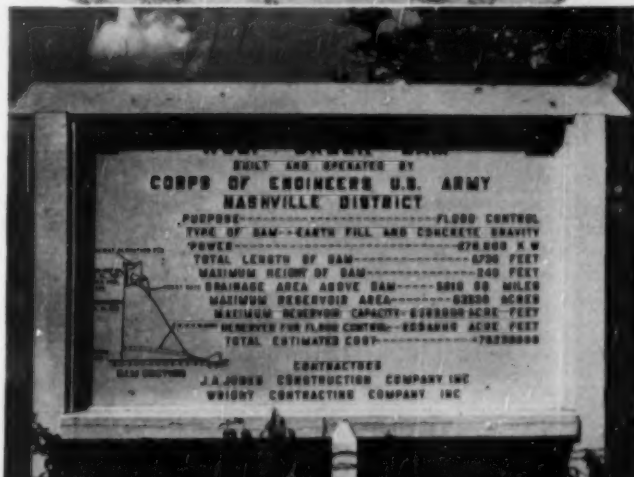
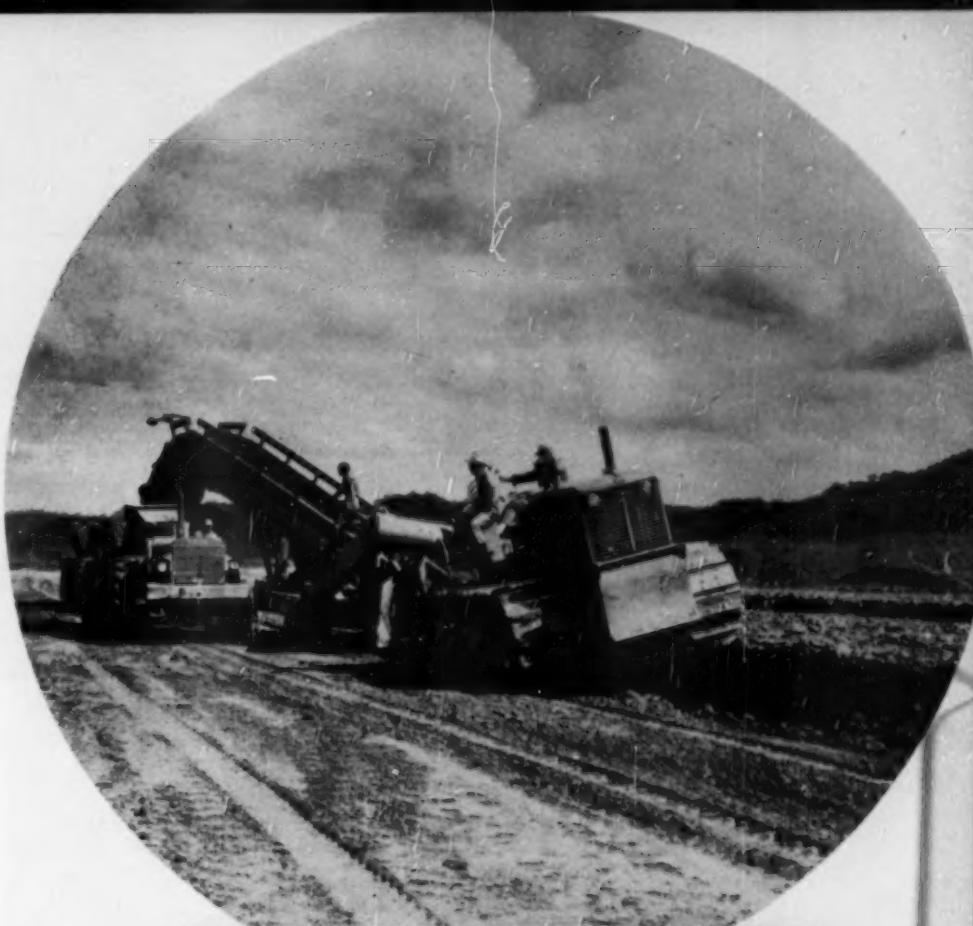
DIESELS FOR CLEARING

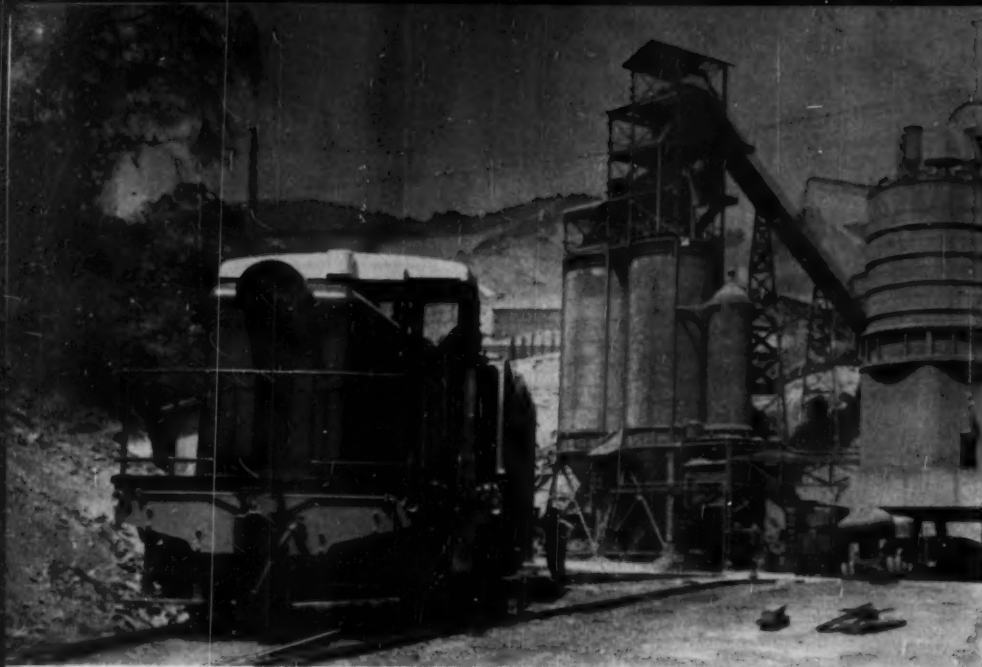
A FLEET of Allis-Chalmers HD-5's, 10's and HD-19's has recently undertaken one of the largest and most difficult land clearing jobs ever attempted—the Wolf Creek Dam and Reservoir project located in southeastern Kentucky. From the dam site on the Cumberland River to 460 river miles upstream where the Cumberland and Ohio Rivers converge, the 101 square mile reservoir runs an irregular course, north, northeast.

Two general methods of clearing have been developed to suit conditions in the reservoir area; regular clearing on the normal sloping terrain, and bank or bluff clearing. The most difficult and dangerous operation is the bank clearing and bluff work. In both methods, felling crews move ahead the power equipment force. After felling work is completed, Allis-Chalmers HD-5's, HD-10's and powerful HD-19's move into the felled area. The HD-5's and HD-10's, equipped with cable winches, crawl up the steep banks to winch down the tremendous mass of cut timber and brush. Perched high on the bluff or steep slope, usually 100 to 150 feet above the stream bed, the tractors let out cable to men who secure it to the timber and brush. When this is done, the tractor moves down slope, letting out 50 or more feet of cable. Then, stopping, the tractor hauls in, dragging the scrambled mass of felled material up close. Next the felled material is brought down to creek bed, where it is picked up by HD-19's with deck rakes and piled for burning and eventual burial.

The controlling point of this expansive man-made lake is Wolf Creek Dam. It will regulate flows from the upper Cumberland River watershed. When completed, this combination earth and concrete gravity type structure, 5,736 feet long, with a maximum height of 240 feet above its lowest foundation, will connect the north portion of the valley with a high bluff on the south side of the Cumberland River. The earth embankment will be composed of selected earth placed by the rolled earth fill method. As a protection against wave action, the upstream surface will be faced with a three-foot layer of stone rip-rap. The downstream slope will be provided with a drainage system and the entire area will be sodded to prevent erosion.

On a 15-hour work basis, 30,000 yards of earth are being moved daily by a fleet of Euclid wagons loading under the belts of three loaders, each pulled by an Allis-Chalmers HD-19 torque converter tractor. The haul distance from the borrow pit to the top of the fill is approximately 1½ miles. State highway 35 will run across the top of this structure. Besides flood control and general conservation advantages, Wolf Creek Dam will provide power for about one million homes. Total output will be 900,000,000 kw. hours per year.





At Permanente's cement plant, two GE locomotives powered by dual Cummins diesels handle all of the rail car switching.

OPERATION "CEMENT" DIESELIZED

By DOUGLAS SHEARING

IN super-heavy hauling jobs, such as transporting rock from limestone quarries, the biggest and most powerful engines available are indispensable for efficient, profitable operation. That's why in the cement manufacturing industry diesels are almost universally called upon to power loaded tractor-trailer combinations that weigh up to 220,000 pounds.

At the Southwestern Portland Cement Co. quarry near Victorville, Calif., loads like that are all in a day's work for the five diesels they depend on to power their triple-side-dump double trailer rigs, that weigh forty-six tons empty and up to one hundred and eleven tons loaded, running back and forth on the six-mile slope between the quarry and a rail siding. Round trips over the three per

cent average grade take approximately fifty-five minutes, including loading and unloading. Each of the five Mack tractors used on this cement haul is powered by a 200 hp. supercharged Cummins diesel and equipped with 200 gal. hydrotarders for braking. Southwestern has used diesels since 1935 and now operates a total of 36 diesel trucks for jobs that range from transportation of limestone from the quarry to pulling flatbed delivery trailers that haul as many as 512 sacks of cement weighing ninety-five pounds each.

Diesel trucks also are considered an operational necessity by the Riverside Cement Co., running the world's largest dry-process kilns, at Oro Grande, Calif. Four Cummins-powered Autocar tractors are used at Riverside to pull single semi-trailers that carry up to thirty-eight tons of limestone on their two and one-half mile haul between the quarry and primary crusher. Also, twenty-one additional Autocars powered by Cummins handle line-haul work carrying sack and bulk cement. Like Southwestern, Riverside is a veteran in diesel experience, having operated diesels since 1939.

At Permanente Cement Co., Permanente, Calif., diesels power two forty-ton GE locomotives and eighteen trucks that pull flat-bed delivery trailers. Fourteen-month average for each truck in Permanente's fleet of eighteen units is 150,000 miles. Two Sterling and sixteen Peterbilt tractors, all Cummins-powered, average 6.2 miles per gallon

Thirteen Cummins-powered rigs like this traveled 9,000 miles in fifteen days to deliver 532,000 sacks of Permanente cement.

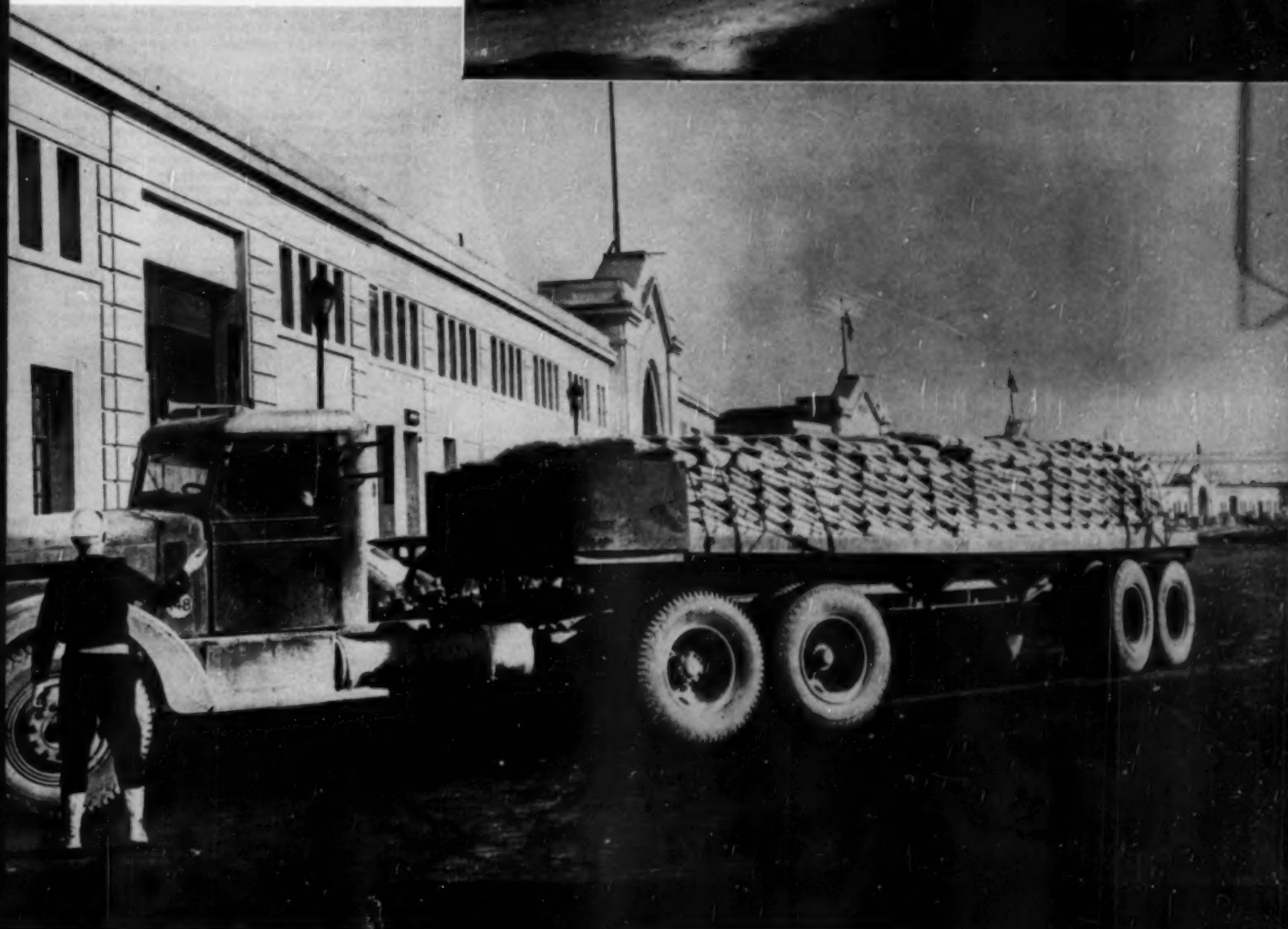
Southwestern Portland Cement Co. semi-trailer dump rig waiting for 65-ton load of limestone.



and haul sack cement all over northern California. The two forty-ton GE locomotives, each powered with dual supercharged Cummins engines, average sixteen hours a day on a five-day week schedule. Permanente has worked these locomotives since 1941. All during the war they were operated three shifts a day.

Pacific Portland Cement Co., San Juan Bautista, is one of the most recent cement companies to dieselize, and perhaps the most enthusiastic about the advantages of diesel efficiency. Before 1948, Pacific powered four White dump trucks with 184 hp. gasoline engines. These trucks, with a hauling capacity of 110,000 pounds each, operated on a five per cent grade, six and one-half miles one way. In one six-month period, this company spent \$8,000 keeping the four gasoline engines in commission. That performance record called for some drastic revision of power, and in May, 1948, a 200 hp. Cummins diesel was installed in the first truck. After thirteen months, the only maintenance work required on this engine was replacement of a fan belt. Harvey Johnston, who heads Pacific's cement-hauling operation, sums up the difference between diesel and gasoline engines. "We're doing as much work now with three diesels as we did before with four gasoline engines, and there's no comparison in maintenance costs."

Hydraulic hoists are used to dump this diesel-powered White tractor that carries a limestone payload of 55 tons for Pacific Portland Cement.



ONE MAN - 717 SHIPS - \$100,000,000

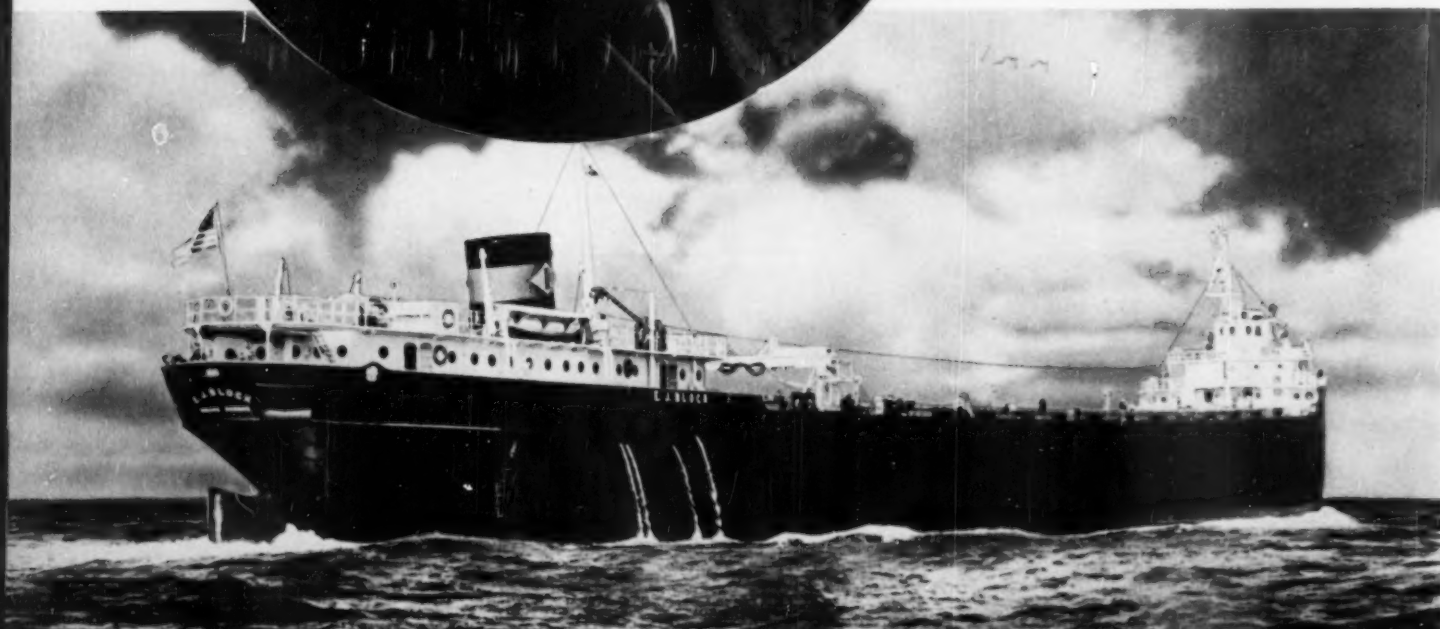
AN INTERVIEW WITH THE GRAND-DADDY OF DIESEL ELECTRIC DRIVE—G. W. CODRINGTON



➤ Largest GM diesel-electric operated ship is the *Fulton*, one of several United States Navy submarine mother ships which serviced our submarines in the Pacific during World War II. These are 16,000-ton vessels, each boasting 11,200 shaft hp. They are 529 feet 6 inches overall and house complete machine repairs shops and parts depots.

➤ George W. Codrington, Vice President, General Motors Corporation, and General Manager of the Cleveland Diesel Division of the corporation. Mr. Codrington is the man who is mainly responsible for selling diesel-electric drive to these 717 ships. The estimated value of the propelling machinery aboard these ships is one hundred million dollars.

➤ Diesel-electric propulsion has invaded the Great Lakes, as exemplified in the *E. J. Block*, an ore and coal carrier owned by the Inland Steel Company and powered with GM diesel-electric drive.

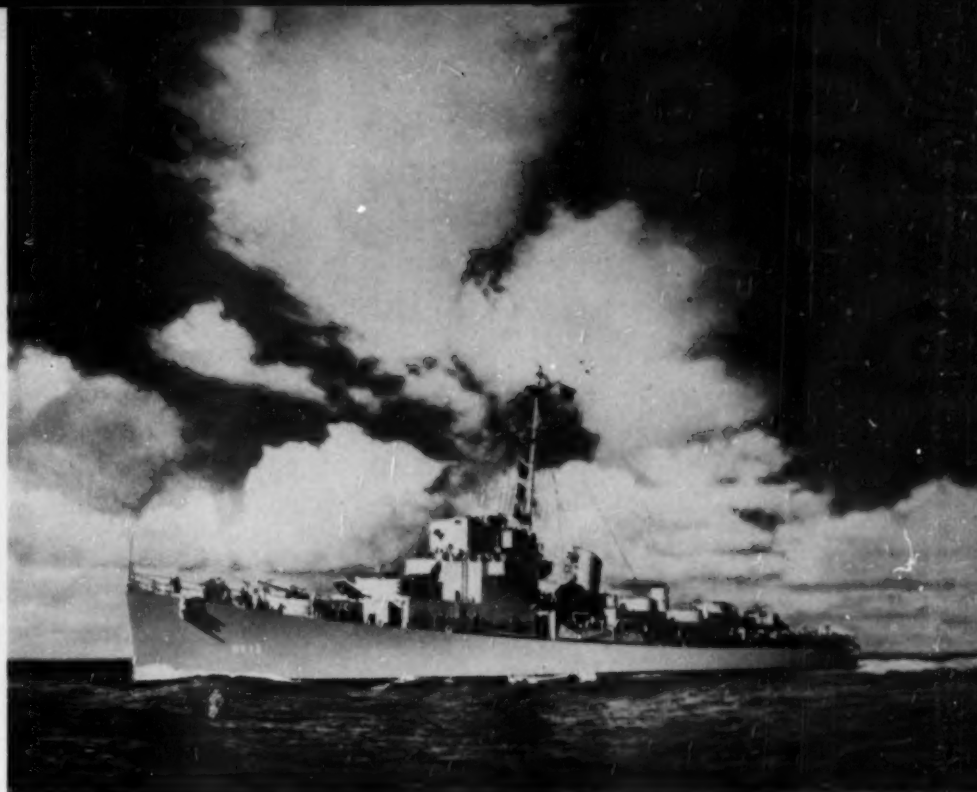


AMERICA today is witnessing a major maritime revolution in which diesel-electric drive is supplanting steam for the propulsion of vessels of many types. Today's trend from steam to diesel-electric is just as pronounced as was the change-over from sail to steam a hundred or more years ago, and the diesel-electric drive is proving just as popular and economically advantageous in the marine field as it has for railroad passenger streamliners and freight locomotives. The company has furnished diesel-electric propulsion for 717 vessels of 22 different classifications and nearly a hundred of these vessels are employed in and about New York harbor.

With diesel-electric drive, the diesel engines operate generators which in turn make electricity to run the driving motors which operate the propellers, and furnish current for lights, pumps and winches. This affords the pilot instantaneous pushbutton control of the vessel's power from the pilot house and bridge. A rapid upsurge in the use of the diesel-electric drive came during World War II, when the United States Navy adopted it for many classes of war vessels because of its great dependability, easy maneuverability and rapid response to controls. Because of its outstanding success in war service, commercial marine boat builders, owners and operators were quick to recognize the many operating and economic advantages of this new form of propulsion. Already the Moran Towing and Transportation Company of New York has nearly thirty GM diesel-electric tugboats in active service.

Among the 22 classes of vessels now having diesel-electric drive are tugboats, ferries, lighters, dredges, tankers, yachts, cargo ships, fire boats, barges, sandsuckers, lightships, ice breakers, submarines, submarine tenders, mine-sweepers, net tenders, destroyer escorts, landing craft, rescue vessels, mine planters, store ships and survey boats. Commercial users of diesel-electric vessels in New York harbor alone include the Lehigh Valley Railroad, Erie Railroad, Pennsylvania Railroad, Electric Ferries Company, Moran Towing & Transportation Company, Coral Sea Company, Great Lakes Dredge & Dock Company, Long Island Railroad, Card Towing Company, Mystic Steamship Company and McWilliams Blue Line.

Commercial vessels, like Navy ships, are used in the hardest and most gruelling service, and diesel-electric propulsion has been the answer to many problems. For instance, most of the big ocean liners—including the world's largest ships, the *Queen Elizabeth* and the *Queen Mary*—are now docked and sailed with the aid of diesel-electric tugboats. In commercial work, lives and property are at stake, and operating costs are another prime factor. Diesel-electric drive is used on ships ranging from tugboats to huge submarine tenders of more than 16,000 tons, in coastwise service, the Great Lakes, the Pacific and Gulf coasts and in world-wide towing service, and everywhere it has been piling up amazing records for the economical and dependable handling of record tonnages. Those are the words of George W. Codrington as spoken to your editor in the Biltmore Hotel, New York, some two weeks ago.



Many destroyer escorts, which performed such valiant service during the late war, were powered with GM diesel-electric drive. These vessels are 300 feet overall and their main duty in the war was the convoying of merchant ships—and what a wonderful page in history they wrote!



Many United States submarines are powered with GM diesel-electric drive in work demanding instantaneous split-second control, the highest degree of dependability, and the greatest maneuverability.

A fleet of five GM powered diesel-electric tugs of the Moran Towing & Transportation Company dock the *Queen Mary* and of course many other huge trans-Atlantic liners. The famous skyline of New York may be seen in the background.





Avila pumping station, with Union Oil Company's 2,600-foot dock in background.

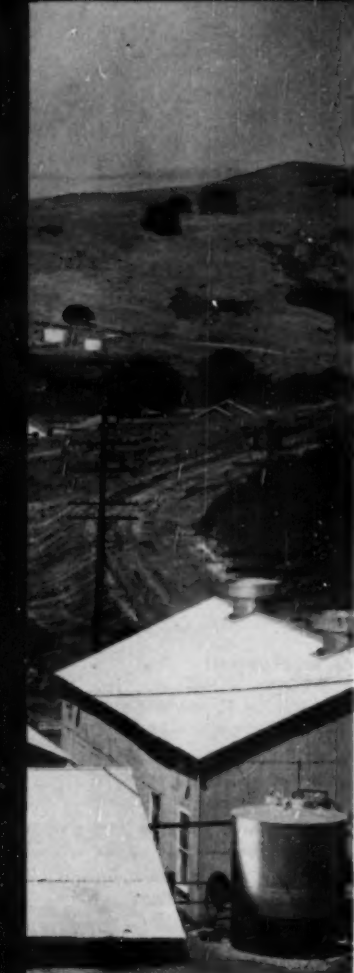
UNION OIL'S AVILA STATION

By FRED M. BURT and A. A. DeCICCO

LOCATED at San Luis Obispo on the Southern California Coast, Union Oil Company's Avila pipeline terminal has been enlarged and completely modernized. This terminal has been operating since 1910, and its main source of power was steam turbines. At a cost of a million and a quarter dollars, the steam turbines were removed and replaced by three Enterprise dual-fuel diesel engines. Supervising this modernization program was Fritz Karge, in the Manufacturing

Department at the Union Oil Company, and he directed this installation into one of the most compact, up-to-date power plants in that area. The engineering and station construction work was done by the J. B. Gill Company and most of the pipeline field work was handled by The Webb Construction Company. The Avila pumping station is set up as a receiving and shipping point for gasoline and diesel fuel oil (incoming) and for crude oil (outgoing). The crude oil comes to the

terminal storage tanks via pipelines and it is already dehydrated and stabilized for preparation for shipment. There are two pipelines coming from the San Joaquin Valley, Midway-Sunset area, and there are two more pipelines coming from the Coastal Fields in the Santa Maria area. The outgoing crude oil is pumped into Union Oil tankers that are able to tie-up at the 2,600-foot dock that is built on to the station and is approximately 1,000 yards from the power plant. The



tankers transport this crude oil to Union Oil refineries at Oleum (near San Francisco) and Wilmington (Los Angeles). Upon returning to the Avila station, the tankers unload refined oil products which serve as bulk plant for truck distribution throughout the San Luis Obispo marketing area. This area handles about 22,000 barrels of gasoline per month.

With the new piping system and the increase of pipeline diameters, the pumping station now has a rated capacity of 20,000 barrels per hour. This is an average, but as much as 22,000 barrels per hour have been pumped into a tanker. This was a light oil, not the heavy oil.

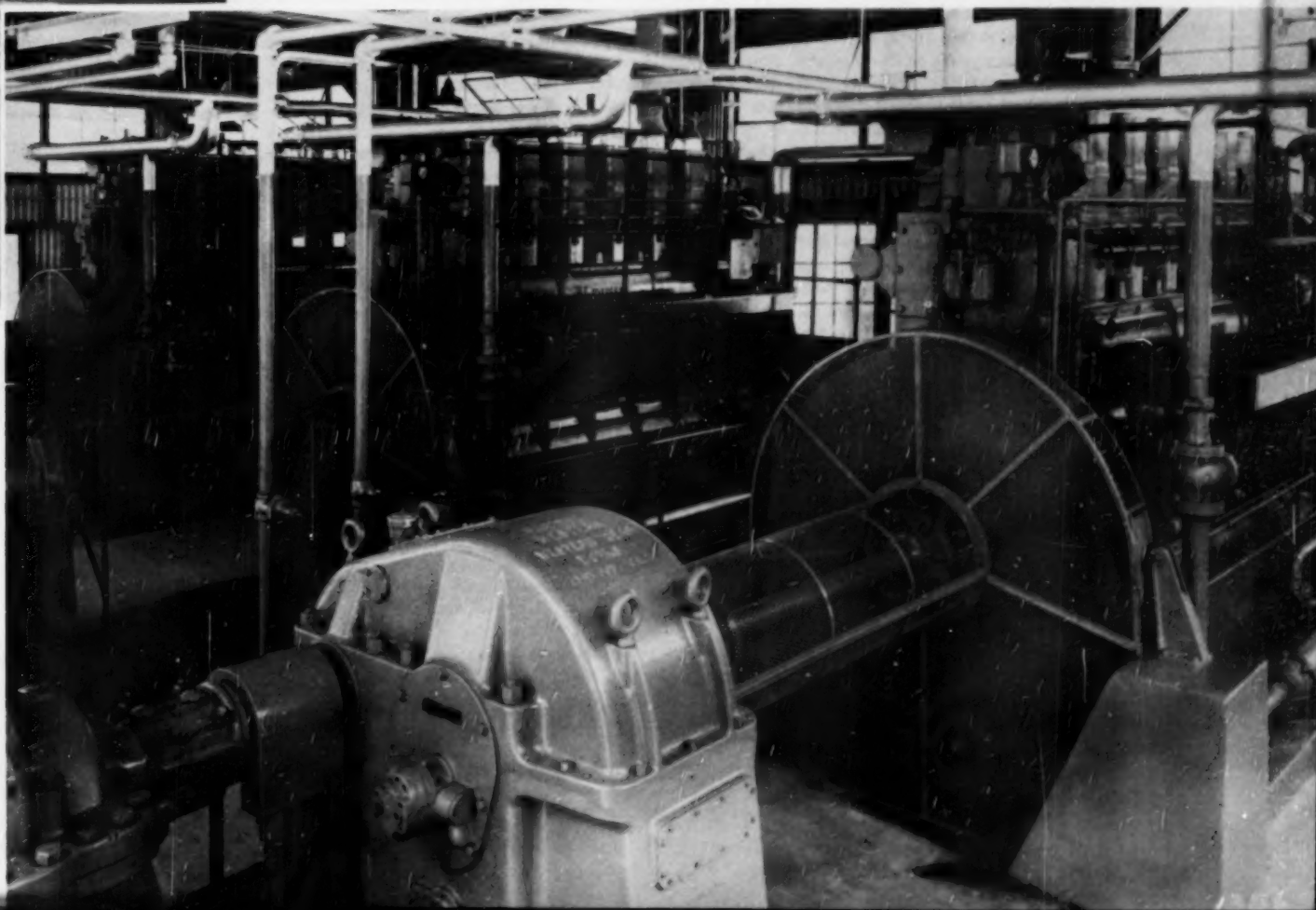
The Union Oil Company, taking into consideration the cost of new boilers, boiler rooms and excessive help, decided upon diesel units for economy in pumping its oil and simplicity of maintenance. Before modernization, the pumping was done with two single-stage, Ingersoll-Rand centrifugal pumps. These pumps have been overhauled and supplemented with a new, similar pump unit. Formerly, the two pumps were powered by steam turbines, with steam generated in four 300-hp. gas oil fired boilers.

These steam power units have been replaced by three 460-hp. Enterprise dual-fuel diesel engines regulated at 450 rpm. This is the first installation of the dual-fuel variable load, variable speed service Enterprise diesels. Each engine has six cylinders with a 12-inch bore and a 15-

inch stroke directly driving a Pacific-Western gear to speed the output of the engine, which is 450 rpm., to 1,780 rpm. at the Ingersoll-Rand centrifugal pump. The fuel oil system is unique in that the fuel oil is strained and filtered several times before entering the engine. Fuel oil passes through Purolator filters and is then picked up by the fuel pump and forced through Winslow filters at 20 to 25 psi. From there it goes to the Bendix-Scintilla injection system and injected into the engine. All three engines being of the dry sump type, lubrication oil is picked up from the sump and is passed through a Bailey strainer that is connected to the suction line of the lubrication pump. There pressure is built up, about 45 to 50 pounds, and then the oil is forced through a Cuno strainer. A part of the discharge lube oil is put through a Young oil cooler to keep the oil at 150 degrees. A Luber-Finer filter receives the oil from a discharge line and releases the oil to the reservoir, or sump.

The engines are started and heated on diesel fuel oil before switching to gas. After the engine starts, it is not turned to dual-fuel until water temperatures in the manifold reach at least 130°F. and the engine is turning at 400 rpm. or more. Gas fuel is admitted between 1½ psi. to 3½ psi., and is directly injected into the air passages but is not timed to the admission cycle. The gas admission is balanced so that each cylinder output is equal to all other cylinders. This individual cylinder balancing is accomplished by

Three 460 hp. dual-fuel Enterprise engines driving Ingersoll-Rand pumps through Western Gears.





Piping system and Young radiators with blowers powered by natural-gas engines for jacket water cooling.

the adjustment of needle valves until the exhaust temperatures of the cylinders balance within close limits. The exhaust temperatures of the dual-fuel is 795° maximum, while the exhaust temperatures on the diesel fuel runs at 710°F. maximum. If one of the engines is running on dual-fuel and the operator wants to stop the engine, he must switch to straight fuel. This is done by slowing the engine down to 400 rpm. and pushing the fuel lever from "gas" to "oil fuel" and immediately close the cock 1½ inches and closing the Globe valve on the gas line.

The initial proportioning of the gas to the pilot fuel is manual with a Woodward governor controlling the amount of gas admitted, to the quantity required to sustain the speed and load demand. Controls prevent admission of the fuel combination in excess of full load operation requirements. In case of excessive jacket water temperature, low lubricating oil pressure, or engine overspeed, Viking safety controls built into the engine actuate an automatic shut-off of gas supply first and then pilot fuel to prevent a possibility of an explosion of accumulated gas in the manifold or exhaust stack.

Jacket water is cooled through Young radiators with thermostatically-controlled automatic air shutters. Large blowers with a fan of six feet in diameter are powered by a four-cylinder natural gas engine. Air intake is filtered by three American Cycloil air filters, and exhaust is silenced by Maxims on the engines. Starting air for the engines is supplied by a Quincy air compressor. A standby for this unit is a gasoline engine that is used when current is low, or for emergencies.

To speed the movement of oil, the piping system of the station was re-designed and engineered and the by-pass arrangements and manifolding were simplified. A new 20-inch suction line from oil tanks to pumps now replaces a former 12-inch line while the 16-inch lines were left unchanged. The entire manifolding system was revised to provide separate lines for light and heavy oil. The two 12-inch lines and the one 16-inch discharge line were found to have sufficient capacity for the new pumping equipment. Cathodic protection was added to all underground lines and the addition of two 113,000 and one 135,000 barrel storage tanks increased the total terminal storage capacity to 1,000,000 barrels. The foamite system in the tank farm was changed from wet to dry.

Automatic remote gauges installed in the field tanks permit instantaneous, accurate (within one-eighth of an inch) gauging from the station control board. The readings of every oil tank on the station can be recorded by these instruments and a project of placing them throughout the entire station is presently in operation. The discharge pressures of the heavy oil averages 160 psi. while the light oils average 120 psi. Discharge pressures at the dock while a tanker is being loaded are held to 100 psi. with automatic controls shutting down the pump engines at the plant if the discharge pressures reach 125 psi. A manually operated shut-off switch at the dock can be used in case of emergency. Of the three oil lines leading to the dock, only two parallel lines can be used at a time. This was due to the laying of the lines leading from the station to the dock.

The reduction of loading time by at least one-third

plus the far more efficient use of fuel for pumping power has effected an over-all fuel saving from 80 to 90 per cent. Another very important fact of this new pumping unit that is most appealing to the Union Oil Company is that for every hour the tanker loading time is cut, there is a saving of more than \$100 in ship operating costs. In one of the most convincing pumping operations on the plant to date, three ships with a total capacity of 290,000 barrels of oil were docked, loaded and discharged within 20 hours, and the actual loading time took only 24 hours.

In speaking with the engineers that run this new dual-fuel plant, they admit that maintenance, actual operation and care of the unit will save much time and money compared with steam power.

List of Equipment

Dual Fuel Engines—Enterprise Engine & Foundry Co.
Air Filters—American Air Filter.
Alarm Systems—Viking Instrument Co.
Exhaust Silencers—Maxim Silencer Co.
Fuel Injection Equipment—Bendix Scintilla.
Fuel Oil Filters—Purolator Products Inc.; Winslow Engineering Co.
Fuel Oil Heaters—Young Radiator Co.
Governor—Woodward Governor Co.
Jacket Water Coolers—Young Radiator Co.
Lube Oil Filters—Luber-Finer, Inc.
Lube Oil Coolers—Young Radiator Co.
Lube Oil Tank Gauges—Rochester Mfg. Co.; U. S. Gauge Co.
Pyrometer—Illinois Testing Laboratories, Inc.
Starting Air Compressors—Quincy Air Compressor Co.
Valves and Fittings—Walworth Company.
Lube Oil Filters—Cuno Engineering Co.

Loading Union Oil's tanker *Lompoc* with crude oil through 8-inch hose lines.





The CIS6 on trial run near St. Louis.



Main engine is a F-M, 7-cylinder Model 31A, 420 hp. diesel.

UNIQUE DIESEL-ELECTRIC TOWBOAT

By DOUGLAS SHEARING

EARLY last year one of the most interesting towboats of the past few years was given its dock and river trials at the plant of the St. Louis Shipbuilding & Steel Co. This towboat, the CIS6, was built for the Carnegie-Illinois Steel Corporation by the St. Louis Shipbuilding & Steel Co. for use in shifting coal barges at the Carnegie-Illinois docks and around the Clairton Harbor.

The CIS6 has a diesel-electric drive. A Fairbanks-Morse 420 hp. 7-cylinder Model 31A $8\frac{1}{2} \times 11\frac{1}{2}$, 514 rpm. marine diesel engine drives a General Electric Co. marine type D.C. propulsion generator, rated CY-290 kw.-514 rpm.-250 volts. A D.C. control and motor excitation exciter rated 5 kw., 125 volts, supplies motor and control excitation, and is V-belt driven from the main generator. A D.C. propulsion generator-exciter rated 3 kw. 125 volts supplies excitation power to the main generator and is direct connected to the control and motor exciter.

The propulsion motor is a two bearing, single armature, drip-proof direct current motor, equipped with thrust bearing. It is rated 350 hp. at 350/400 rpm.—250 volts D.C., and was manufactured by General Electric Co. The propulsion controls, also furnished by General Electric, consist of an engine room control stand and propulsion motor controls in the pilot house.

In appearance, the CIS6 is also unusual. It does not have towing knees and the forward bulkhead of the main deckhouse slopes aft to afford the pilot a better view of the forward deck. The hull, 70 ft. by 18 ft. by 9 ft. deep, has a draft of about 6 ft. 3 in. The stern is similar to a tug stern, and the bow is of special Carnegie-Illinois Corporation design, being a combination model and acow bow.

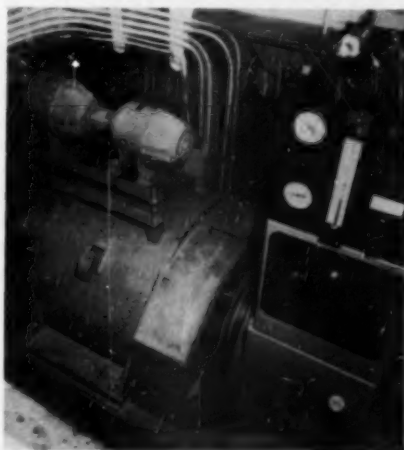
The shell plating for the hull is of $\frac{3}{4}$ in. Cor-ten steel, manufactured by Carnegie-Illinois Steel Corporation. This Cor-ten steel is a high tensile, corrosion resisting steel, and this same steel is being used on some oil barges now being built

by St. Louis Shipbuilding to give the hulls a longer life and greater strength. As the CIS6 is to be used in the Clairton harbor, no living quarters are provided. There is one room aft of the engine room to be used for shelter for the crew.

Pilot house control on this boat is much simpler than on a direct diesel drive. The direction of rotation and rpm. of the propeller is controlled by a single handle in the center of the pilot house stand. The two backing rudders and one steering rudder are separately controlled by two St. Louis Shipbuilding Electro-hydraulic steering gears of the electric follow-up type.

The electric power for searchlights, lights, small pumps, etc., is furnished by a U. S. Motors 20 kw., 125 volt D.C. generating set. The starting air compressor is a Quincy No. 320 compressor, driven by a 5 hp. motor. The 12 in. incandescent searchlight was furnished by Carlisle-Finch, the Airhorn by Kahlenberg, the electric driven bilge pump by Smith-Meeker, and the heating boiler and radi-

The main generator, a G.E. Marine type DC machine with belt-driven control and motor exciter and direct-connected generator exciter.



tors by Crane Co. The storage battery for the auxiliary power system is an Exide 56 cell 117 A.H.-LX-15 battery.

The CIS6 will be used only to maneuver barges at the Carnegie-Illinois landing at Clairton, and in this service frequent reversings are required. It was for this reason that the owner selected a diesel-electric drive. Although the initial cost over a direct drive is considerable, the excellent maneuverability, reliability, and low maintenance cost should result in a more economical overall cost of operation.

Diesel-electric propulsion has been considered by many owners for a number of years, but to the best of our knowledge, the CIS6 is the first diesel electric boat especially designed and built for shifting service at the dock. It is believed that other owners with similar problems will watch the operations of the CIS6 with interest, and the successful performance of this boat will no doubt lead to other boats being built for similar service.

View of the propulsion motor, a G.E. drip-proof DC unit, rated 350 hp. at 350/400.





Mobile service training unit arrives at Downsview Dam, New York City's huge water supply project, for a two-day session in diesel engine mechanics.

Men responsible for the operation of GM diesels at the Walsh and Perini Companies listen carefully as the instructor briefs them on factory approved service procedures.

"Classroom" equipment is unloaded from the truck. This can be assembled and ready for on-the-job instruction within half an hour.

DIESEL SCHOOL GOES TO PUPILS

By DOUGLAS SHEARING

ONE solution to the contractor's problem of keeping expensive equipment working at top speed under adverse conditions has been found by the Detroit Diesel Engine Division in on-the-job service training. Today, with a record number of major construction projects under way, skillful maintenance and operation of equipment is of interest to equipment manufacturers and the suppliers of power as well as to the contractors. Few contractors have the time or facilities to train their service men in proper maintenance practices once a job is started. Detroit Diesel has stepped up to the situation with two mobile diesel engine training schools manned by competent factory instructors. Each unit carries all the equip-

ment needed for a two-day course in advanced diesel engine mechanics on a smartly designed GMC two-ton cab-over-engine truck.

A three-cylinder cutaway engine makes it easy for trainees to see and thoroughly understand the construction and operation of the GM two-cycle diesel engine. After instruction in engine tune-up and diagnosis has been given, another engine is thoroughly "gummed-up" by the instructors and the class works to locate its "troubles" and get it running smoothly again. Manometer testing apparatus, sub-assemblies, charts, movies, slides and many other items contribute to the effectiveness of the course. The equipment can be unloaded

from the truck and set up ready for school in half an hour. Service problems peculiar to the job at hand are discussed and methods advanced.

One of these units recently visited Downsview Dam, New York City's huge water supply project. There employees of D. Perini & Sons, Walsh Construction Company and their sub-contractors attended the two-day session. On this job 110 pieces of diesel powered equipment alone are in operation. Other projects visited by these schools include Garrison Dam, Neversink Dam, mining projects of the Mesabi Range, Cherry Creek Dam, Aspen Tunnel and many others both east and west of the Mississippi River.

SOUTHERN PACIFIC DIESELIZES IN A BIG WAY

By CHARLES F. A. MANN

ONCE the Southern Pacific System, when it was a part of the SP-UP Combine, was the largest railroad on earth. Today, split into twin huge independent corporations, the Southern Pacific is still a magnificent property, and the longest continuous stretch of track in the world—3,100 miles between New Orleans and Portland, Oregon, is the backbone of the largest single-track railroad empire on earth, outside of Russia. The very monopolistic factors that gave it great power and prestige, and frequently has slowed down the resourcefulness of its management, springs from the fact of the peculiar manner in which the Southern Pacific is built.

Essentially 90 per cent of its vast trackage, stretching from 1,000 miles away in Mexico; New Orleans, Tucumcari, Portland and Ogden, with its twin-axis terminals at San Francisco and Los Angeles—is all single track. Long ago its management hit on the policy of rather than build a double track to handle growing traffic, it simply moved over into more virgin country and built alternate main lines through new territory, linking them in occasional bottlenecks that required deft railroading to prevent total breakdowns, especially in boom or war times.

In its San Francisco, Los Angeles and Portland terminals, in the old days, its monopolistic nature gave rise to huge subsidiary operations, many over-extended and many unprofitable. At San Francisco, its total monopoly status actually gave rise to the entire Bay Bridge system and the competitive pressure of automobile competition abruptly converting its once profitable ferry and commuting train monopolies into headaches.

Out of all this has come a giant railroad, heavily steeped in tradition; reaching into the most productive areas of one-third of the U. S. A., and a management inheriting all the traditions and weaknesses of alternate astuteness and perhaps a touch of myopia, or plain laziness—born of a



The new Shasta Daylight on the Southern Pacific.

The fiesta car—a coffee shop with bar on the Golden State.



reluctance to move out of the cozy, though perhaps oftentimes inertia-ridden warmth of a giant transportation monopoly, typical disease of all large enterprises, whether government or private.

It was thus natural, as on the Pennsylvania and Union Pacific railroads, to avoid the realm of diesel motive power as long as possible. Like its two sister giants, the S.P. rushed in and loaded the system with so-called "modern" steam power at the dawn of the diesel era, twelve years ago. Its topographical obstacles, cheapness of waste black boiler fuel oil from the refineries on its lines, and its policy of running as long and heavy train consists as could be handled by the signal and sidetrack layouts, and as few of them in a day as possible, gave rise naturally to a superior fleet of heavy steam power. In fact, it ranked second in the United States of America.

The single-track characteristics of the entire system, plus the mountains, made the business of operating short, light, frequent train service a physical impossibility. Too many trains cluttered up the lines till nothing could move. The one-speed railroad idea was born on the Southern Pacific. Freight trains run exceptionally fast, while passenger trains, till the streamliner idea hit, ran nominally slow by comparison. These long 20-car passenger trains and 100-car freights produced the big steam power the S.P. worshipped too long. The articulated consolidations, the famed S.P. back-up Mallet steamers, spawned into the largest fleet of its kind in the world.

Diesel for ten years fell on deaf ears of the S.P. management, despite the cold facts showing that the S.P. could have saved \$8,000,000 per year for those same ten years had it been dieselized instead of steam. But you cannot go on paying out \$2.32 for steam fuel where \$1.00 worth of diesel fuel would do the same work, forever, without those iron laws of economics catching up.

A. T. Mercier, the up and coming successor-president of S.P., who followed the longest line of the most stubborn steam-minded officials in U. S. railroad history, put it into official words.

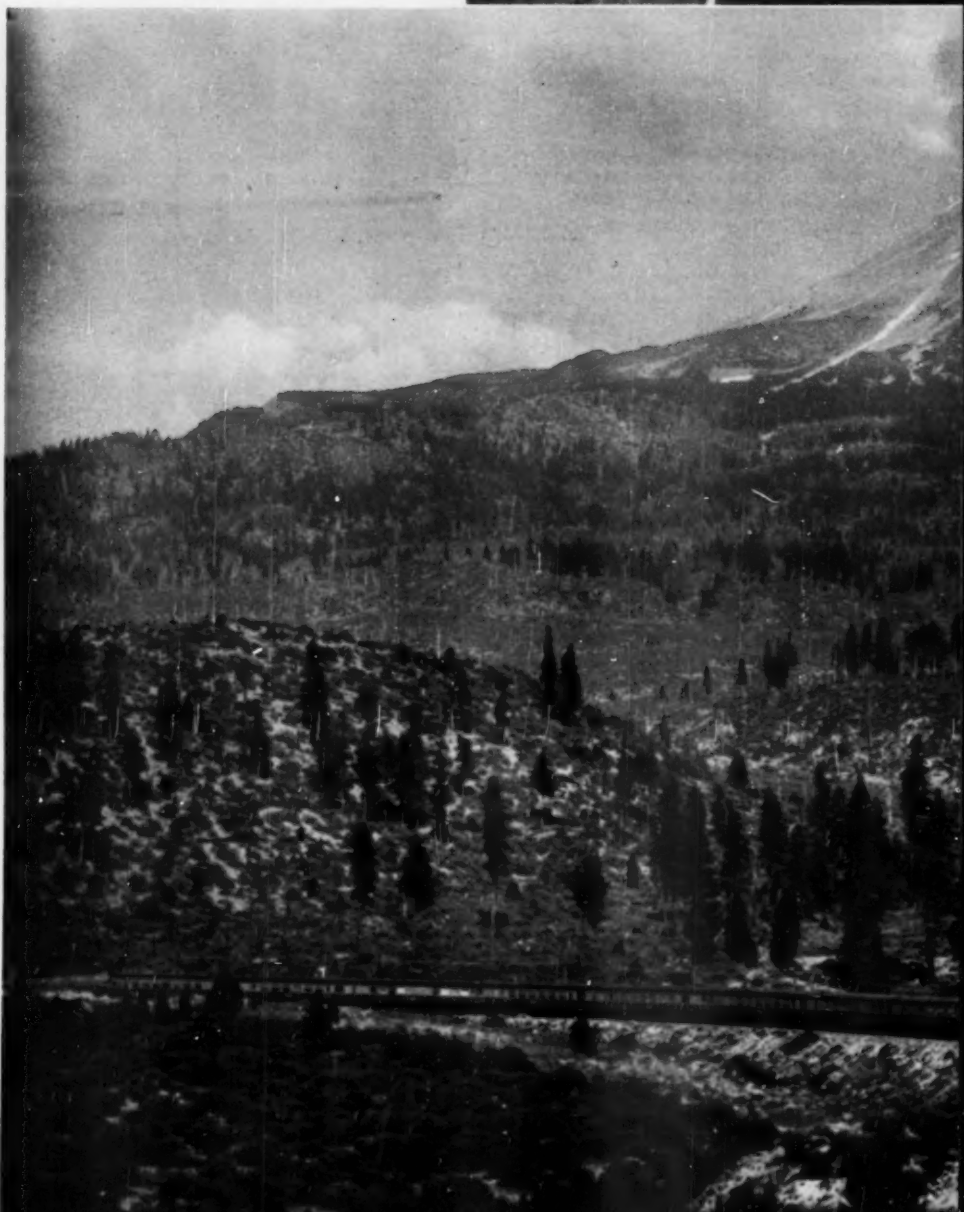
"Diesels provide a means of meeting competition and keeping costs, therefore rates down. We must cut our costs to the point where we can compete with the trucks to get traffic back and keep more railroad workers employed. Diesels can pull heavier loads than steamers. . . . They require less helper service. . . . They make better time. . . . They can make long runs without being serviced. . . . They spend less time out for repairs. . . . A freight road diesel will do as much work on \$1 worth of fuel as will a comparable steam engine on \$2.32 worth. They are easier on track. . . . To date the S.P. has a total of 404 diesel locomotives in service or on order to be delivered before this summer, a total of nearly 970,000 hp. . . . Our long range plan is that over the next ten years more diesels will be purchased to replace all but the newest units of our present steam power by 1960. . . . The change will be gradual and


general throughout the entire system, but branch line operation will be completely dieselized first."

There you have it straight from President Mercier—Southern Pacific is going diesel just as fast as the changeover and economics can do the most spectacular dieselization job in North America—repowering the single-track colossus.

First S.P. diesels were the jointly owned SP-UP-CNW *City of San Francisco* streamliner diesels in 1936. In 1939 the S.P. bought its first diesel switcher. Since V-J Day the S.P. has ordered nearly \$90,000,000 of diesel locomotives. The diesel locomotives fall into four major categories. Freight, as to be expected from the long train-heavy gradient characteristics of S.P., are all 6,000 hp. Passengers are 6,000 hp. for the mountain regions and 4,000 hp. for the flatter areas of Nevada, Central California and Texas. Fourth category comprises the 600, 1,000 and 1,500 hp. switchers and road-switchers.

Picture window on the coaches of the *Shasta Daylight*.





The diesel passenger fleet, amazingly small for this giant system, comprises five 6,000 hp. from Electro Motive Division and General Motors; six 6,000 hp. Alcos and six 4,000 hp. Alcos. The "name trains" on which these operate are the *Golden State*, *Lark*, *Cascade*, *Shasta Daylight* and *Sunset Limited*. As their streamlined Class GS steamers wear out, the entire "Daylight" fleet will be diesel powered.

The EMD passenger units are their standard three-unit heavy, fast diesels, with large water and fuel capacity and geared for maximum speeds. The Alco units are similar, and develop a 92,000 drawbar pull at 20 miles per hour, ideal for the Shasta Route mountain runs on the *Shasta Daylight*, and are geared for 90 mph.

A total of ninety-eight 6,000 hp., four-unit EMD freight diesels have been ordered, with all in service by June of this year. Basically, the arid, alkaline water, sunlit desert-mountain region radiating out of Los Angeles is the locale of

The new *Shasta Daylight* at the base of Mount Shasta.

the heavy freight diesel program. The San Joaquin line over the Tehachapi Mountains as far north as Bakersfield; the crooked, semi-mountainous coast line to Watsonville Junction and San Jose; east to El Paso and San Antonio, and the Nevada Desert region between Sparks (Reno) and Ogden. Twenty-two diesel freighters will operate between Sacramento and Eugene.

At the war's end the S.P. had 139 diesel switchers in service, one of the largest fleets of its kind in the country. Since the war, an additional 151 have been ordered, and with exception of a few arriving during the winter, all are now in service. They are of 1,000 and 600 hp. in addition to seventeen road switch diesels of 1,500 hp. scheduled for delivery during the coming summer. All makers are participating—Baldwin, American, EMD, and General Electric.

Assignment of the diesel switchers follows a pattern almost uniform throughout the entire system, with the largest assignment in the Los Angeles and San Francisco terminals. The comprehensive program to replace all mainline passenger equipment with semi-lightweight streamline cars will give each of its four long routes two deluxe daily diesel streamliners when the program is completed, comparable or better than the *Lark* and *Daylight* trains on the coast line between San Francisco and Los Angeles. The streamlining of the *Golden State*, *Sunset*, *Cascade*, new *Shasta Daylight*, all follow the pattern established by the San Francisco-Chicago streamliners and the *Daylights*, in a program that began 12 years ago. S.P. has ordered approximately \$240,000,000 worth of new cars and locomotives since V-J Day. At first chary of the dynamic brake system on the diesels, they since have become standard on all their fleet units as acquired.

As previously mentioned, the Southern Pacific moves slowly, but when it does it moves thoroughly, ponderously, expensively and, amazingly, sometimes daringly into channels that startle America and the entire world railroad industry. Newest U. S. super deluxe trains of all types are the twin 15-car *Shasta Daylights*, boldly conceived to literally take the status of a death duel with highway and airplane traffic of all types.

Representing a total investment of \$5,000,000, the *Shasta Daylights* leave both terminals each morning at 7:45, and make the fabulous run of 718 miles, one-third of which is over mountains, in 15½ hours flat. Two Alco special type 6,000 hp. diesels power the trains. Each carries nine deluxe chair cars, baggage-postal car, a triple unit kitchen-coffee shop-diner combination, with seats for 132 people at a sitting, and a total revenue passenger capacity of 442 passengers. A parlor-observation and a tavern car round out the consist of each. Every modern "must" is incorporated in the trains—giant "skyview windows," 30 per cent larger than normal; thermopane, air conditioning; rubber mounting of running gear; tightlock couplers; baggage elevators; pneumatic door openers; public address system; fluorescent lighting; electro-pneumatic brakes; gas engine



The Golden State of the Southern Pacific arriving at Palm Springs, California.

generator and refrigeration sets under each car; roller bearings and sponge rubber and plastics everywhere, not to mention dual toilets in every wash room and propane gas for cooking in the kitchen. On the economic side the fare is amazingly priced at \$12 one way and \$21.60 the round trip—lower than the former bus fares and twice as fast! Both trains gross \$8 per mile each way, daily, a phenomenal record and the greatest scenic travel bargain in the U. S. A. The \$5 million investment will definitely be a profitable one, what with annual gross revenues expected to exceed \$3,000,000 for the twin trains. They have suddenly, since last July, become the travel and railroad operating sensation of the U. S. A., with 20,000 cash customers riding the trains in the first three weeks. Their giant diesels can easily pull the trains up the steepest part of the Cascade and Siskiyou grades at top permissible speed with throttles not all the way open. The trains make eleven intermediate stops and average 47.5 miles per hour for the 714-mile trip. Maintenance is at West Oakland, California, and Portland, Oregon, during the eight-hour layover each night.

With the full fleet of 407 diesels expected to be in service on the S.P. this June, there still remains

an estimated roster of 1,600 steam locomotives that will yet continue in service. These include the largest and newest fleet of *Backup Mallets*—S.P. calls them articulated consolidations, and the 4-8-4 fleet of general service steamers for freight and passenger. In planning the elimination of steam facilities, it naturally follows that the thin branch lines, the desert runs and the tough time-card freight and passenger moves where competition governs, will get the bulk of the diesels. The well-watered main trunk lines radiating from large established shop facilities, will continue to serve both steam and diesel. The heavy Sierra Mountain run will, along with the Siskiyou line of the Shasta route and the flat Texas routes on the T. & N. O., continue the dual power status. New or drastically remodelled "garage type" diesel shop facilities will be the rule on the S.P. Los Angeles, with its new million dollar Taylor Yard diesel shop, has the finest and first of its kind on the system. Because it was built fresh from the ground up, it is the most modern shop on the entire system. It is a six-track maintenance building with pits under the tracks, and the building is 351x140 feet. Inspection pits are 215 feet long, with lights, electric and other facility lead-ins. A machine shop, sand-

ing, water, washing, lube oil and fuel facilities feature the extensive layout, together with all necessary equipment for fast parts replacement, from a fuel injector, to a crankshaft, to an entire diesel engine or power truck.

Assigned out of Los Angeles, to be serviced at the new Taylor diesel shops, are forty four-unit diesel freighters; five three-unit 6,000 hp. diesel passengers; four 1,500 hp. branch line diesels; and forty-two diesel switchers. Six more 6,000 hp. diesels are scheduled to go in service and base at Taylor shops. The passenger diesels, in pool operation between Los Angeles and Tucumcari, New Mexico, make two round trips every five days. Twice in this interval short inspection stops are made, the third time in the cycle is a 10-hour maintenance cycle stop. Freight diesels go into Taylor shops every 2,500 miles, after eight round trips over the Tehachapi section and six on the Coast Division. Wheels are checked every fifteen days—a very necessary check.

At Ogden, to take care of all diesel work on the desert division between Sparks and Ogden, and at Roseville (Sacramento) to take care of the Roseville-Eugene, Oregon, freight diesel operation, the passenger diesels on the Sierra and Siskiyou mountain routes, limited new inspection pit and general diesel maintenance facilities are being provided, with part of the Ogden steam shops to eventually be converted to a modern diesel shop.

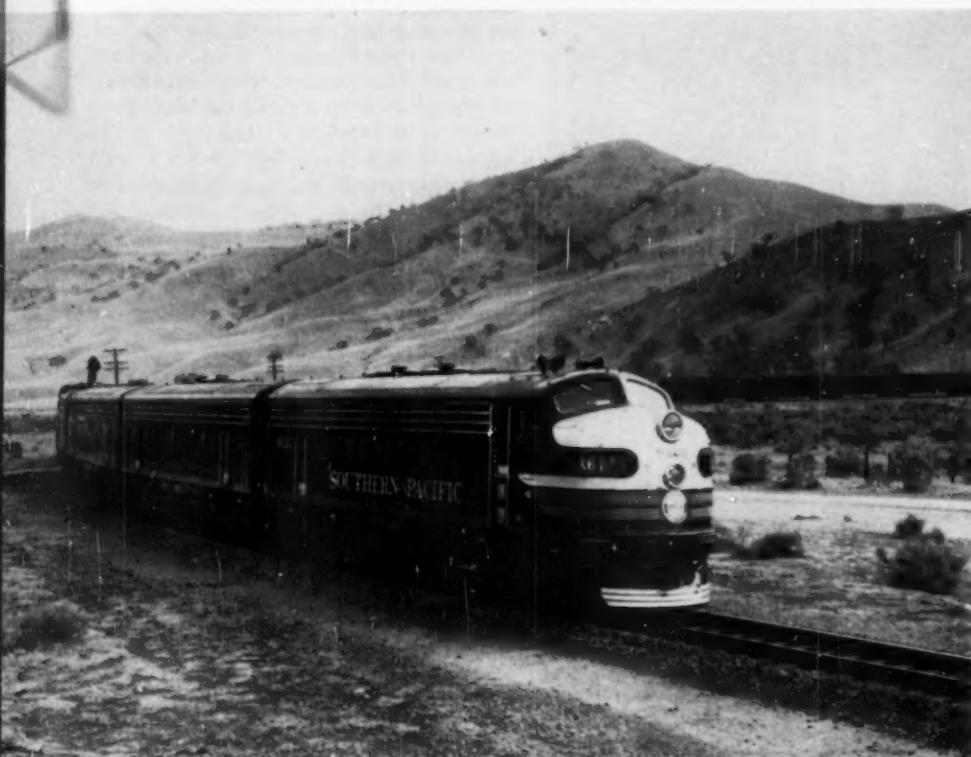
The huge, historic general shops at Sacramento are equipped to do all heavy repair work for the entire Southern Pacific System diesel as well as steam fleet. All major diesel and electrical overhauls from units shipped in from the various diesel shops will be done here, the same as S.P. has done with steam since it began operating, and all parts orders will be filled and stocked. Naturally, as the parts replacement program from factory to railroad supersedes outright parts manufacture by the S.P. as in the days of steam, the whole character of the Sacramento shops will gradually change as the last of steam gives way to diesel. But the pattern of the S.P. is simple—a limited number of modern exclusive diesel shops at key terminals for maintenance and general parts replacement, and the general shop for major rebuilding at Sacramento, California.

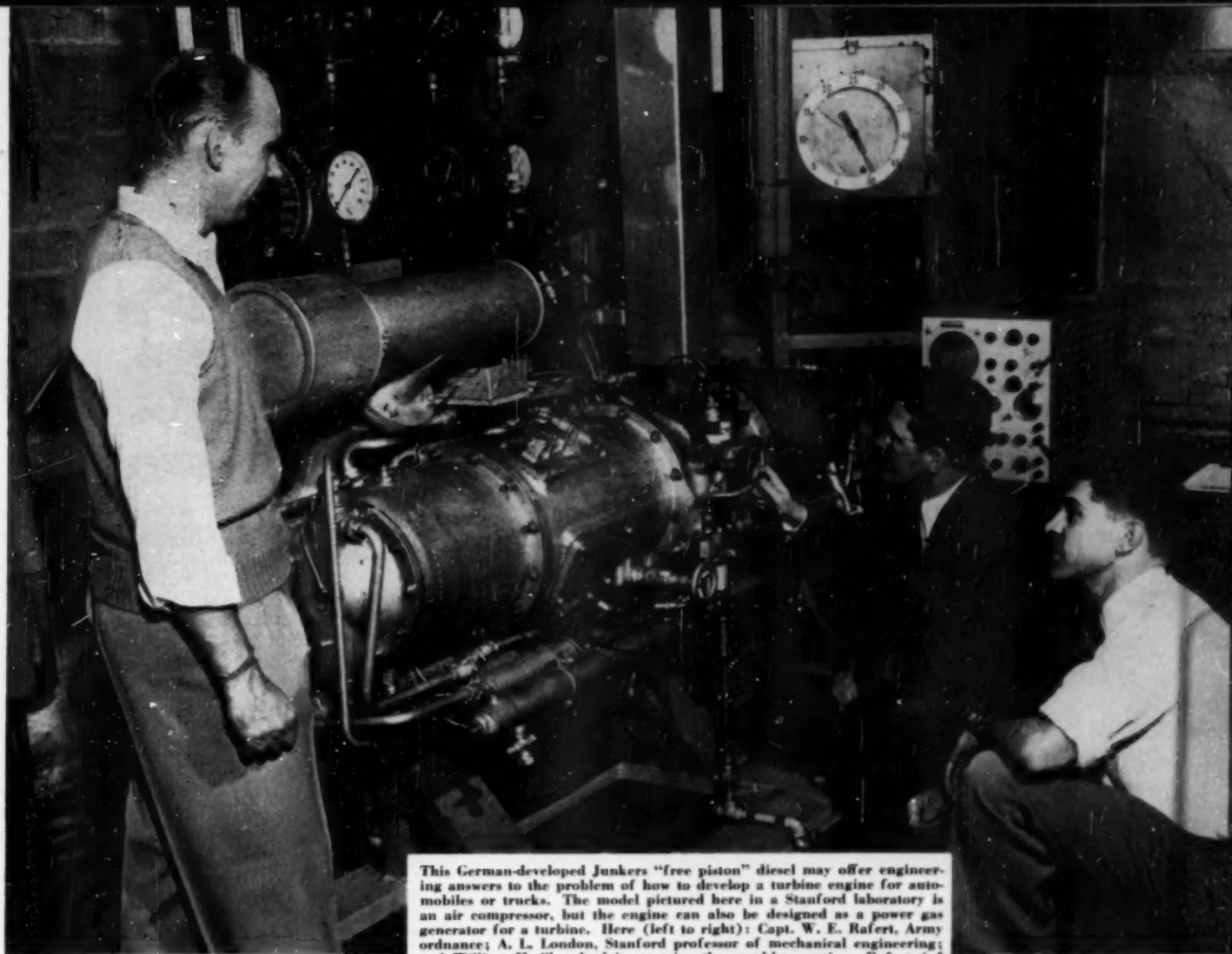
For the first six months of 1949 the S.P. spent \$29,987,249 on freight steam power maintenance and operation, plus \$11,619,366 for locomotive repairs. This gave rise to a cost of \$1.209 per 1,000 gross ton miles with steam, plus 46.8 cents per 1,000 gtm. for repairs alone. These figures are exclusively for freight diesel operation.

Diesel freight operation, while comparatively small compared with the steam totals, naturally, ran slightly over \$4,000,000 for the same period, giving rise to a cost of but 49.5 cents per 1,000 gross ton miles, and but 7.8 cents for locomotive repairs. Thus already the S.P. finds that steam freight locomotives cost a total of \$1.677 per 1,000 gtm.'s as compared with 57.3 cents per 1,000 gtm.'s for diesel! The astounding difference

... and now please turn to page 76 ...

Four unit Electro-Motive diesel freight on the Southern Pacific Tehachapi loop.





This German-developed Junkers "free piston" diesel may offer engineering answers to the problem of how to develop a turbine engine for automobiles or trucks. The model pictured here in a Stanford laboratory is an air compressor, but the engine can also be designed as a power gas generator for a turbine. Here (left to right): Capt. W. E. Rafert, Army ordnance; A. L. London, Stanford professor of mechanical engineering; and William H. Chamberlain examine the crankless engine. Rafert (of Indianapolis, Ind.) and Chamberlain (of Menlo Park) are graduate students doing research work on engine under Prof. London's direction.

ANOTHER FREE PISTON DIESEL

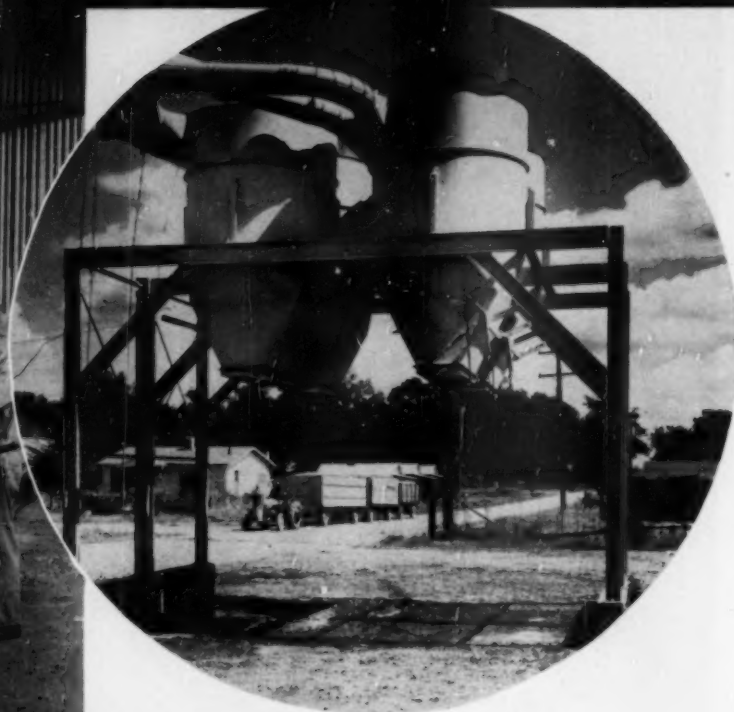
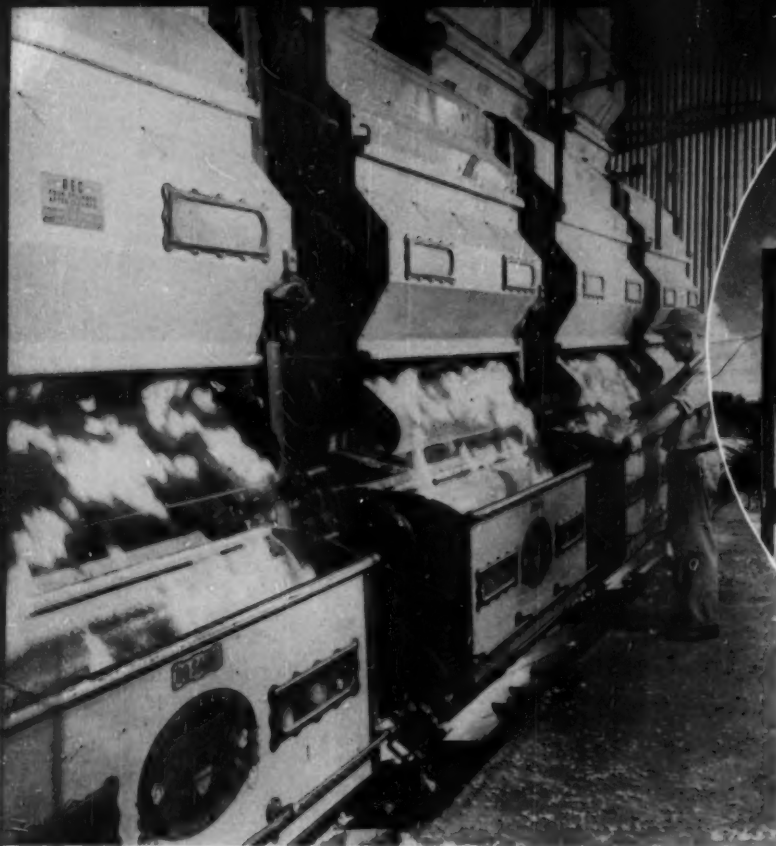
STANFORD UNIVERSITY, Calif., Feb. 10.—A new type of auto or truck engine, using hot gases to turn a turbine, may be the outgrowth of tests being conducted at Stanford on a German-developed Junkers "free piston" diesel compressor. This crankless engine, which runs well on low grade oil, can in principle be made in any size from that of an auto engine up to the size of the largest diesel. Stanford engineers say that its advantages over other engines are that it is light, almost free of vibration, and is inexpensive to build, operate and maintain. The particular engine tested in the Stanford Mechanical Engineering Department under the direction of Professor A. L. London was formerly used as an air compressor in a German submarine and was given to Stanford through the courtesy of the U. S. Bureau of Ships to stimulate research and development of free piston systems on the West Coast.

Professor London says that the design of the engine, which is characterized by extreme mechanical simplicity, makes it suitable for use either as an air compressor or as an all-purpose prime mover. Tests on the engine, carried out by W. H. Chamberlain, of Menlo Park, graduate student in mechanical engineering, confirm German performance claims that it would take 70 cubic feet a minute of free air and compress it to 3,000 pounds per square inch of compressed air.

As a prime mover, Professor London explained, such an engine would produce hot exhaust gases—roughly at a pressure of 100 pounds per square inch—and these gases would drive a turbine which in turn would drive a shaft. Theoretically the free piston diesel-turbine prime mover has a higher thermal efficiency than the modern diesel. The vibration-free qualities of the engine are

demonstrated by the fact that one can successfully balance a coin on edge on the engine while it is in operation. The Stanford work, sponsored by the Office of Naval Research, is aimed at analyzing the thermodynamic and dynamic design aspects of both the air compressor and prime mover types of free piston systems.

Curiously enough, the engineers point out, the free piston engine is not new. It was invented some 20 years ago by a Frenchman named Rault de Pescara, who is still carrying on extensive development work in France. Recent interest in the engine was inspired by both German and French successes in making use of the engine. The German Junkers system tested at Stanford is a single cylinder, 40-hp. opposed piston diesel operating on a two-stroke cycle, with four steps of air compression. The system is designed to produce compressed air for torpedo launching.



Farmers Gin Co., Silver City, Miss.,
 powered with Caterpillar model D375
 diesel cotton gin engine driving five
 Hardwick-Etter fans, separator, dryer,
 23 cylinder cleaner, 14-foot burr
 machine, four extractor feeds, 4-80
 gin stands and two story press.

Duncan Cooperative, Inverness, Miss.,
 twenty fans, two 5-80 Murray gins,
 two presses, two 14-foot burr ma-
 chines, ten extractor feeders, two sep-
 arators, six dryers, four seven-cyl-
 nder inclined cleaners and two nine-
 cylinder multi-unit cleaners.

DIESELS FOR COTTON GINS

By ALFRED A. DeCICCO

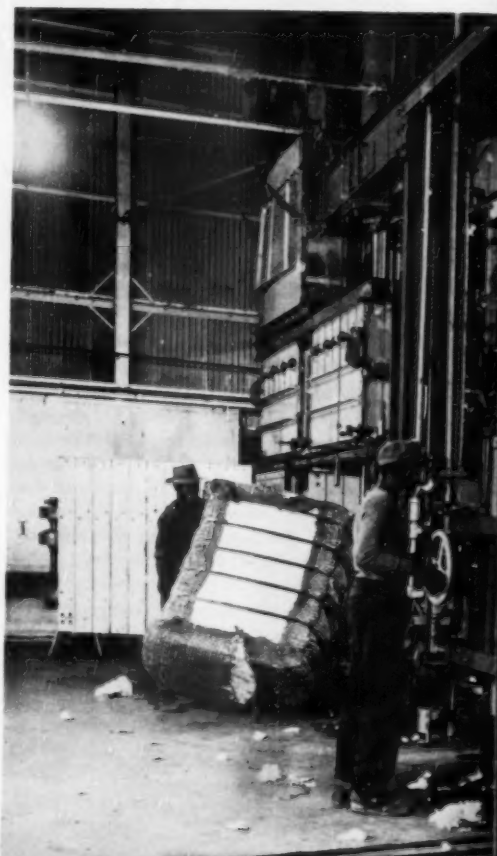
MECHEANIZATION of the planting and har-
 vesting of cotton and the introduction of
 the mechanical cotton picker have challenged
 ginners and manufacturers to keep pace adequa-
 tely to produce quality lint samples satisfactory
 to the markets served by the industry. The me-
 chanical cotton picker has provided ginners with
 a greater cleaning load, but has posed a ginning
 problem of eliminating foreign matter and leaf
 trash from the cotton before it leaves the gin. To
 remove such trash, gin manufacturers and the
 Stoneville Experimental Station at Leland, Miss.,
 have developed heavy duty master cleaners, burr
 extractors, impact cleaners, after cleaners and lint
 cleaners—all valuable contributions to the ad-
 vancement of the industry.

Contingent upon these advances has been the de-
 velopment of more powerful equipment to handle
 the increased horsepower demands. Adding en-
 gines to existing power has proved satisfactory
 in numerous cases, but where ginning facilities
 left installation space at a premium a single en-
 gine of adequate horsepower has been sought to
 handle the situation. Recognizing the need for
 such an engine, capable of producing sufficient
 horsepower to handle the load of additional clean-
 ing equipment over and above the already estab-
 lished separators, dryers, master cleaners, extrac-
 tor feeders, gins, condensers and presses, Cater-
 pillar Tractor Co. has "tailor-made" four new
 Caterpillar diesel cotton gin engines which assure

users top quality samples and increased produc-
 tion. These four new engines range in size up to
 400 hp. for continuous 24-hour duty and are
 equipped with auxiliary water pump, thermom-
 eters, cotton gin air pre-cleaners and breather
 fumes disposal equipment. The ginner has his
 choice of clutches and type of cooling.

Supplementing long-established Caterpillar diesel
 cotton gin engines, which provided horsepower
 outputs up to 162 hp., continuous rating, the new
 engines have continuous ratings of 213 hp. for
 the D364, 268 hp. for the D375, 320 hp. for the
 D386 and 400 hp. for the D397. With such range
 the units can be installed for any size gin, com-
 pounding units where power requirements and
 facilities permit. During the past harvest season,
 typical installations have produced low cost power
 for countless gins throughout the cotton belt.

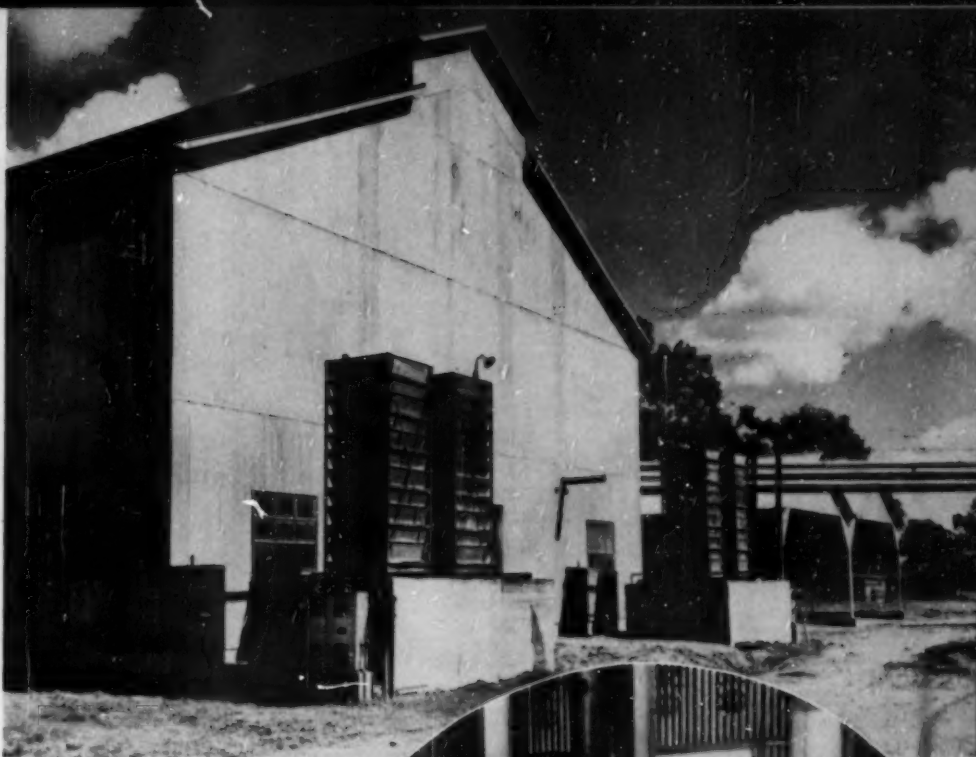
Typical of the single-engine installation has been
 that of the Farmers Gin Co., Inc., Silver City,
 Mississippi, where a D379 cotton gin engine gave
 owners steady power for an hourly output of five
 bales of long staple or six bales of short staple
 cotton. Here the 4/80 Hardwick-Etter gin is
 equipped with separator, dryer, 23-cylinder cleaner,
 14-foot burr machine, distributor, hull extrac-
 tor, cleaner feeders, four-cylinder after cleaners,
 condenser and press. Farmers Gin statistics show
 a 25 per cent savings over previous power with the
 D375. In a 24-hour period this gin turns out 120



bales of Delfos No. 9169 long staple cotton. At the Duncan Co-operative Gin, Inverness, Mississippi, two D397 cotton gin engines handle the power requirements. Duncan has a twin battery Murray outfit with one side being a 5/80 left hand reversed set and the other side a 5/80 right hand reversed set. Seed cotton travels through the separator, full tower dryer, seven-cylinder cleaner, 14-foot burr machine, nine-cylinder multi-unit dryer and cleaner, the second seven-cylinder cleaner, distributor, extractor cleaner feeders, gins, condenser and press.

Duncan production figures show 300 bales of Delta and Pineland cotton every 24 hours on a total estimated load of 675 hp. The two D397's offer reserve power to gin cotton regardless of the condition of the raw material.

Similarly at the Morgan Gin Co., Morgan City, Mississippi, two D397's furnish power for the twin-battery outfit housed in a Murray all-steel gin building. Each of the two engines drives ten fans ranging from 35 inches to 45 inches; one hydraulic pump; four 80-saw Murray gin stands, four Mitchell unit feeders, four Mitchell after cleaners and super Jem units, four lint cleaners, two seven-cylinder cleaners, one 14-foot burr machine, a 72-inch condenser, two Murray separators, a Murray press and a tramper. Travel of the cotton through either side of the gin is from wagon to separator, to full tower dryer, to cleaner, to burr machine, to stub tower dryer, to second cleaner, to conveyor distributor, to super Jem Mitchell units, to after cleaners, to super unit feeders, to gins, to lint cleaners, to condenser and to press. Morgan City produces 200 bales of Delta and Pineland short staple cotton or Wyles & Sea Island long staple cotton daily.

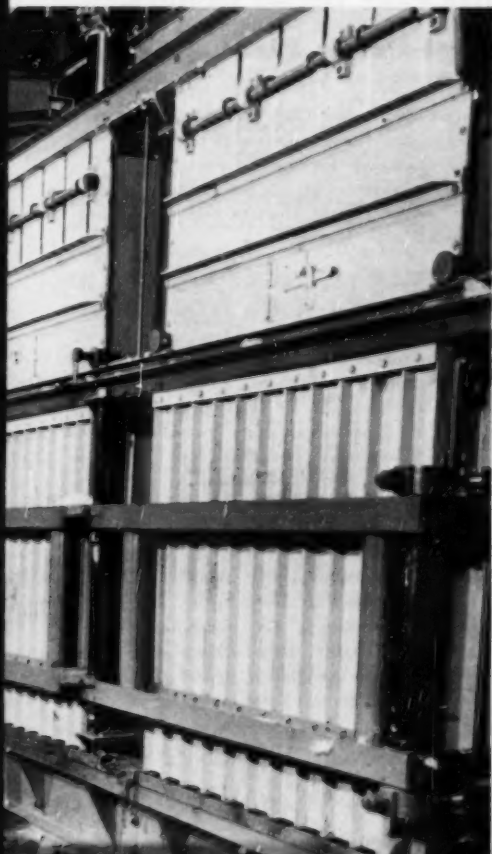
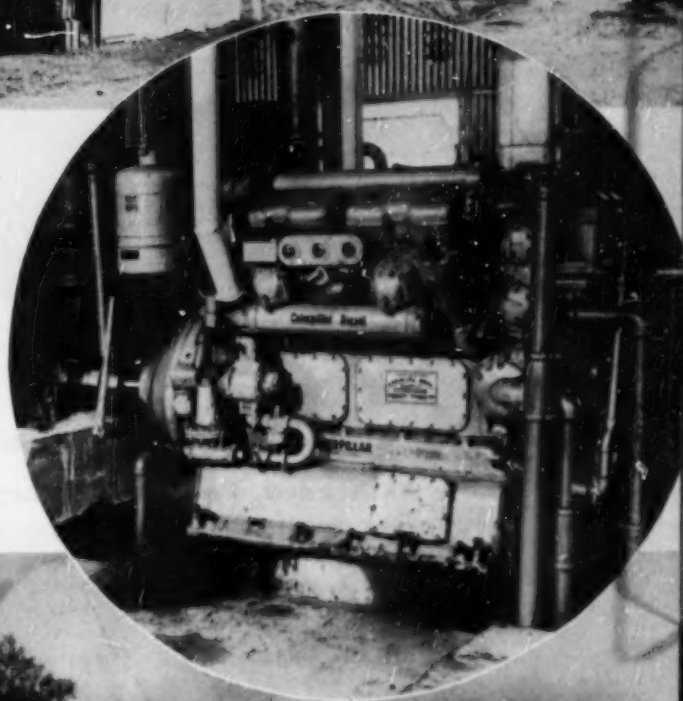


Another view of Duncan Co-operative at Inverness, Miss., two Caterpillar model D397 cotton gin diesels furnish power for this large cotton gin.

A model D375 Caterpillar cotton gin diesel installed in the Farmers Gin Company, Silver City, Miss.

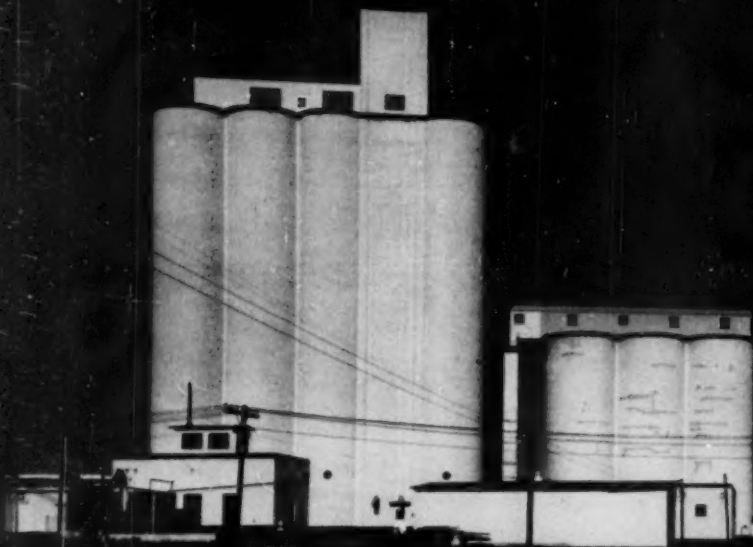
View of the interior of the Duncan Co-operative at Inverness, Miss., powered with a pair of Caterpillar model D397 cotton gin diesels.

Morgan Gin Company, Morgan City, Miss. Two Caterpillar model D397 cotton gin diesels installed here. Each engine powers a 4-80 outfit.



OKEENE, OKLAHOMA

By GEORGE D. CROSSLEY



Okeene Milling Company is the largest single power user in Okeene. Previous to the installation of the Nordberg dualfuel engine, this mill had an emergency diesel engine generating set to augment the power supply it received from the city.

A Town of Eleven Hundred People, Over Eleven Years, Buys Four Diesel Engines, As Needed, From the Money Made by Their Municipal Power Plant

WITH its municipally-owned diesel-electric power plants as a nucleus, Okeene, Oklahoma, has built up under a system of self-support a community offering outstanding educational, recreational, civic and service facilities. The most recent addition to the Okeene power plant, which has grown in size from an annual generation of 640,760 kw. in 1938 to 2,850,550 kw. in 1948, is a Nordberg dualfuel engine. Using natural gas as a fuel this engine saves over \$1,000 a month in fuel and lube oil costs compared with the older oil-burning diesels in the same plant. This savings in operating cost will quickly pay for the new engine. The new engine, as well as the other three engines in the plant, were purchased without a bond issue. The older engines have been completely paid for from receipts.

The new gas-burning engine is a four-cycle, six-cylinder supercharged dualfuel unit of 13-inch bore and 16½-inch stroke, rated at 840 hp. at 450 rpm. Its 590 kw. output practically doubles the capacity of the plant. The three other engine-generators have a combined output of 704 kw. The new engine is able to carry the normal plant

load and due to its lower operating cost is used alone until the load is such that one of the small engines can carry it, usually after midnight. Before the new engine was installed it took all three of the old engines to carry the load and when one engine was shut down it was necessary to cut off part of the load.

Located in the rich, fertile Cimarron River valley, Okeene is an outstanding wheat and milling town. Nearly 2,000,000 bushels of wheat are grown yearly in the Okeene area and grain storage in Okeene is about 1,000,000 bushels. The annual Whea-Esta, a harvest celebration in which the keynote is wheat, is held in Okeene.

In addition to this annual wheat festival, Okeene Junior Chamber of Commerce each spring sponsors the nation's most unusual sporting event, the Rattlesnake Roundup. Gathering at Okeene, snake hunters from many states go into the Gypsum Hills about 15 miles to the west of town to capture alive hundreds of rattlesnakes. The sponsors buy the captured reptiles and sell them throughout the nation to collectors, laboratories and snake

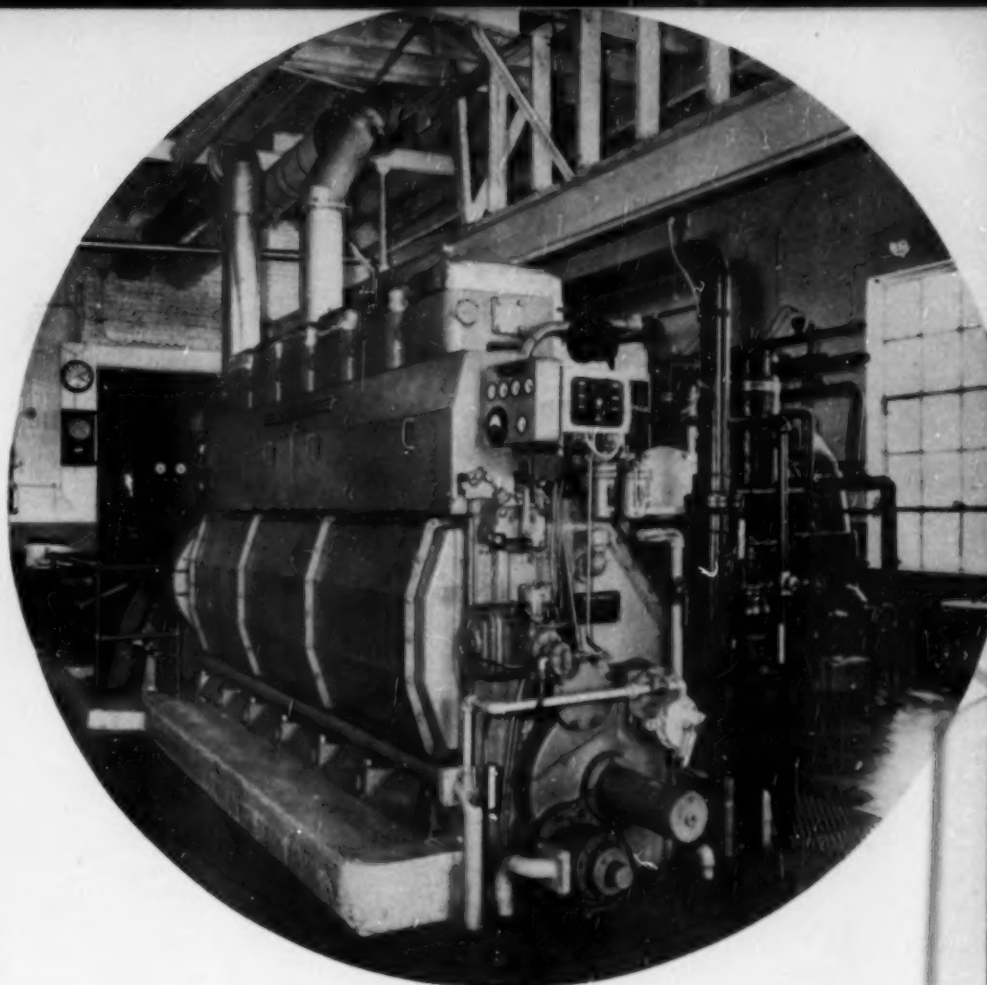
farms. More than 1,000 persons usually attend the roundups which open with a snake exhibit and display in downtown Okeene. During this roundup members of the International Association of Rattlesnake Hunters hold their annual convention in Okeene.

With slightly more than 1,100 people living within its limits, Okeene is one of the best small towns in Oklahoma. It has a good trading area, modern and convenient shopping centers and a church organization for most known groups. Okeene has modern schools and its own city hospital. The community has been an attractive home place for many retired farmers who have found in Okeene the church of their choice and the opportunity to live comfortably in a good, clean and modern town. Okeene has a mutually owned telephone system, a city airport, community building and library. Practically every street in Okeene is paved. The town is served by the Rock Island and Frisco railroads. Two banks have deposits of nearly \$4,000,000. Its school, a member of the North Central Association, specializes in vocational agriculture and home economics.

Since the opening of the country, Okeene's growth has been steady and dependable. Farm and home values have increased steadily during the years. Many of the pioneer families still live in the area and their children established new homes in Okeene, believing that the town offered good opportunities. Largest industry of Okeene is the Okeene Milling Company, which employs regularly about sixty persons, most of whom live in the town. The Farmers Union Exchange adds to the large wheat storage capacity of the town. Okeene is also the East Gateway for the large Canton Dam recreational area. A newly paved road leads directly to the lake area, where fishing, camping and boating facilities attract thousands annually.

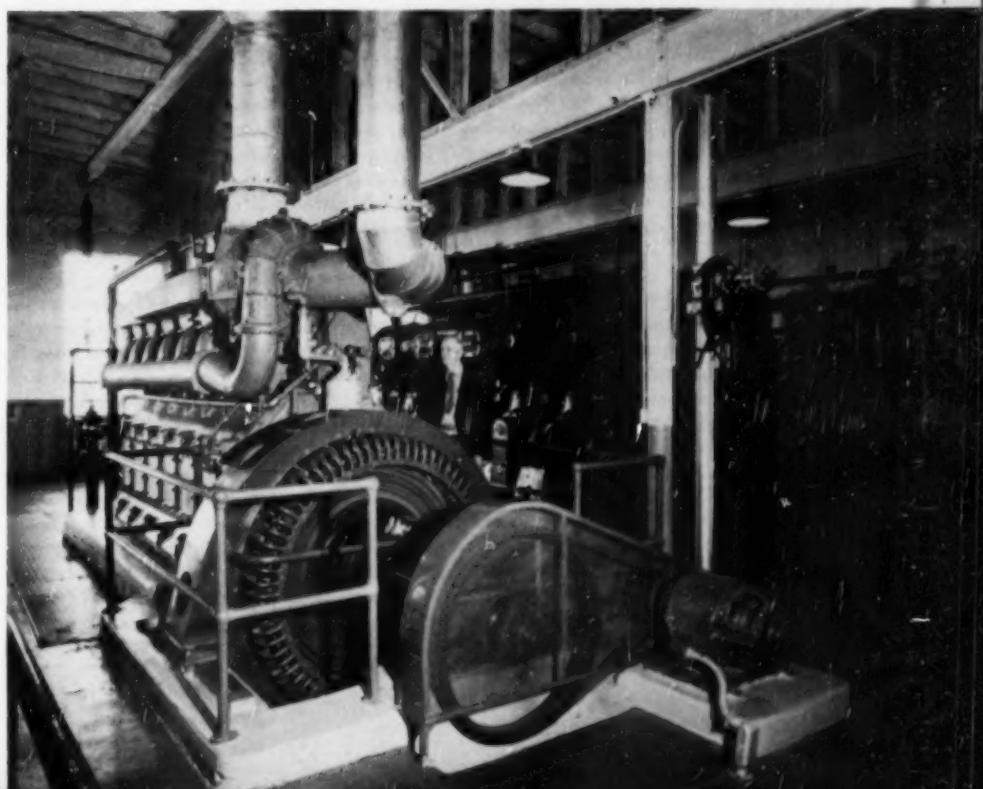
It is through its power plant that Okeene has been able to offer its citizens the many services of this outstanding community. This power plant has been increased in size from a 540 hp. plant in 1938 to a 1,900 hp. plant in 1949. The electric power load of the community has been built up from 640,760 kwh. produced in 1938 to 2,850,550 kwh. produced in 1948, an increase of 445 per cent. At the same time, the water supply has been increased from 100 gpm. to 250 gpm. During this ten-year period labor and operating costs have more than doubled, but the electric rates on an average are cheaper now than they were ten years ago. The Okeene power plant was started in 1916 when an Allis-Chalmers 90 hp. diesel engine was purchased through the issuance of a bond issue for \$15,000. In 1922 a bond issue for \$40,000 enabled the town to purchase an Allis-Chalmers 280 hp. diesel engine. This \$40,000 bond issue in 1922 was the last bond issue to purchase any equipment for the City Light Plant. In 1930 a 360 hp. Fairbanks-Morse diesel engine was purchased and paid for from the profits from the plant. In 1939 a 350 hp. Fairbanks-Morse was purchased and also paid for from the profits of the plant. Profits from the Municipal Light Plant enabled the city to buy another Fairbanks-Morse diesel in 1945.

Within the last 10 years the switchboard at the plant has been enlarged and modernized. The cooling equipment also has been enlarged and modernized. The city has bought a new fire truck, street sweeper, tractor, truck, pick-up, installed booster pump in a new water line, modernized and enlarged its distribution system and paid for paving of city streets amounting to \$85,855. All of these improvements were paid for from the revenues of the light plant. In addition Okeene pays out of the profits from this power plant each year over \$7,000 for the operation of such city services as the police department, fire department, maintenance of streets and alleys, hauling trash, city park and cemetery, and other services. Mr. S. O. Isbill is superintendent of the Okeene Power Plant. Mr. O. L. Goforth is mayor of Okeene. Members of the board of trustees are Melvin Geis and Ed Mehew. Mr. Frank Pietz is clerk, Velma Lotapeich, treasurer, and George F. Dusabek is justice of the peace.



Operating side of Nordberg Elliott-Buchi super-charged dual-fuel engine at Okeene. Two of the older Fairbanks-Morse diesels show up in the background. Alnor pyrometer on instrument panel.

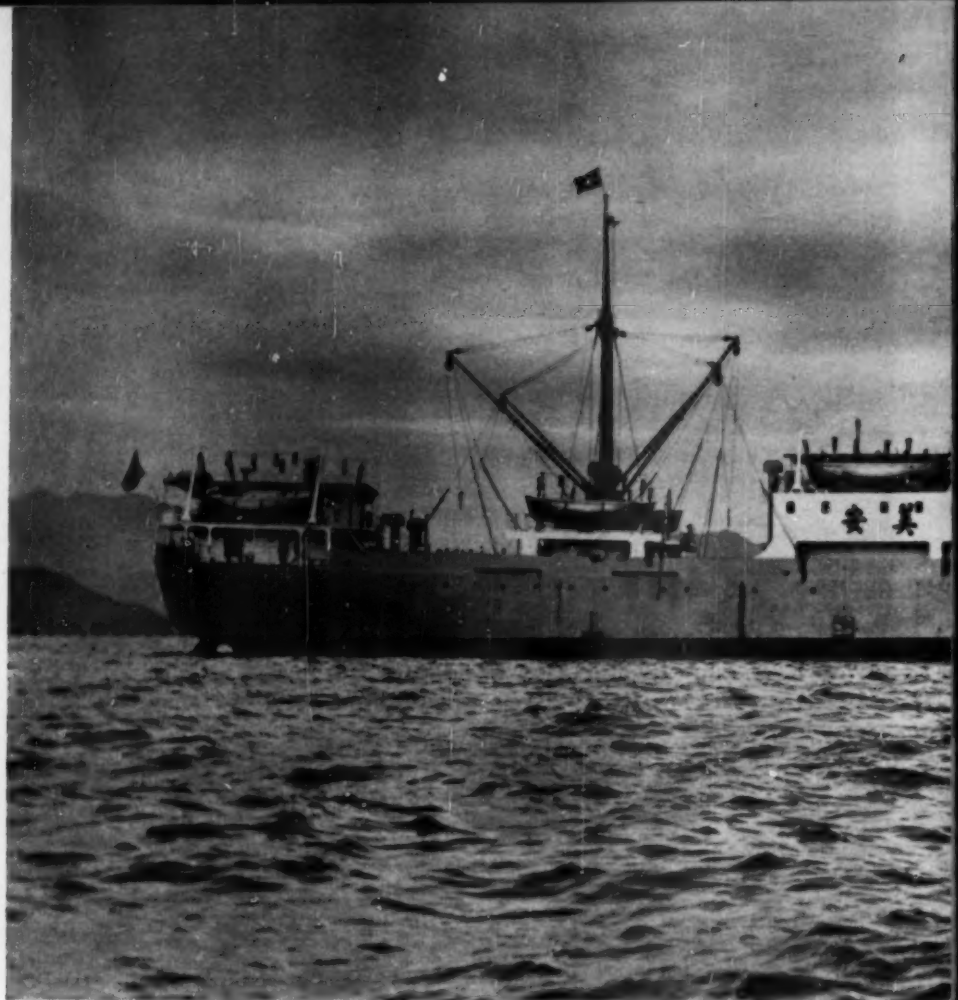
Generator end view of the Nordberg dual-fuel engine in Okeene. Two of the Fairbanks-Morse diesels appear on the right and the third one is on the left (not shown in this picture).



M. S. Mui Ann

New Motorship Built in Norway for China Service

By L. B. COLE



Norwegian motorship *Mui Ann*, owned by Jorgen Krag, built at Kristiansend, Norway. *Mui Ann* employs the GM diesel electric drive principle.

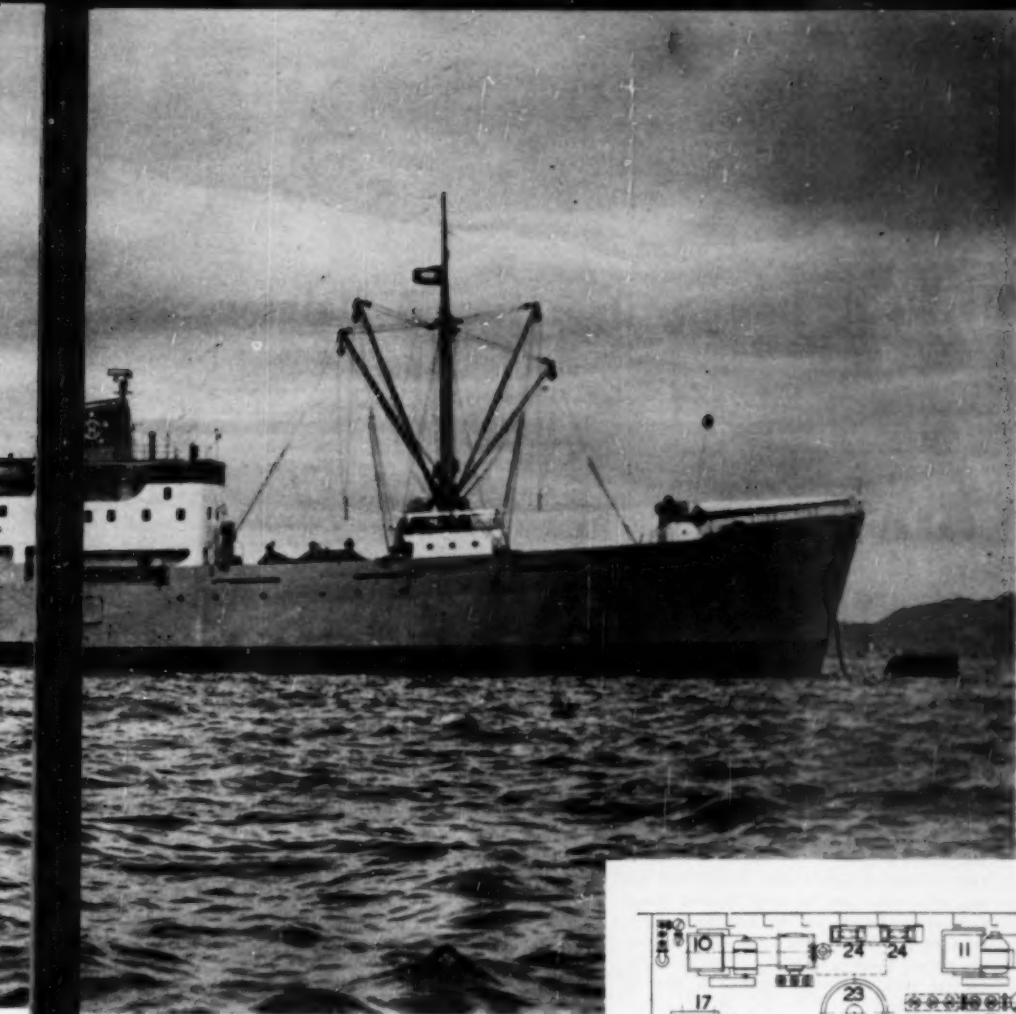
ANOTHER page was written in the glamorous history of trade in the Orient when the new motorship *Mui Ann* dropped anchor in the harbor of Singapore. Junks and sampans, which were the mode of transportation of both cargo and passengers long before the time of Columbus, witnessed the coming into Far East service the newest and finest type of ship yet to be built. In Singapore, after coming from Norway, where she was built, via Denmark with a load of sugar for Beirut and then to Port Said, from where she took on a load of salt for the Far East, was the GM diesel-electric propelled ship—the *Mui Ann*.

The *Mui Ann* has more than one "first" to her credit. She is the first ship of this type to come into the China trade, although more than 700 ships throughout the world have successfully been powered with GM diesel-electric propulsion machinery. The *Mui Ann* is the first ship to be built in Scandinavia to employ this type of power. To Jorgen Krag, owner of the *Mui Ann*, goes the credit for building this vessel. He saw in the *Mui Ann* a rebirth for the shipbuilding industry in Norway and the construction of new vessels for trade in the highly competitive Orient. The *Mui Ann* was built at the yard of Kristiansend, Mek Verk, A.S., Kristiansend, Norway. Again the fine craftsmanship of the Norwegian shipbuilders

was evidenced by the men of this shipyard. Although Kristiansend is not the largest yard in Norway, and the *Mui Ann* is the largest ship yet to be built there, the fundamental principle of Norwegian shipbuilding was apparent throughout the vessel. Although the *Mui Ann* is owned by Jorgen Krag of Norway, she is under charter to the prominent Chinese shipping company, Messrs. Ngow Kock Company, Bangkok, Siam. The *Mui Ann* has an over-all length between perpendiculars of 295 feet, molded breadth of 43 feet, 6 inches, and the gross weight of 2,750 tons.

Although the vessel was designed to do 15 knots, on the trial runs she maintained an average speed of 16¼ knots. The vessel is welded construction built to the highest class in the Norwegian Veritas and to the rules of the Norwegian Ship Control. Included in the navigation and radio equipment is a gyro compass, a radar and echo sounding apparatus. Loudspeaking telephones are installed for communication between the bridge, engine room and the cabins of the captain and the chief engineer, as well as the forecabin. The four propelling engines are of General Motors Corporation manufacture and each is a 12-cylinder, two-cycle, Model 12-278A marine diesel, with a maximum rating of 1,200 bhp. at 750 rpm. The engines are of the solid-injection type and are complete

with integral fuel pumps, combustion air blowers, and required lubricating-oil and water pumps. Each engine drives a direct-connected, main-propulsion generator with a normal service rating of 605 kw. at 560 volts direct current at a speed of 750 rpm. The generators are of drip-proof protective construction from above with a combination of water-tight and splash-proof construction from below; self-ventilated with internal fan attached to the shaft; and it contains one grease lubricated bracket type ball bearing at the after end. The front end of the generator shaft is bolted to the engine crankshaft and is supported by the main bearing of the engine. The generators include an integral starting winding for motorizing the generator from a starting battery, for the purpose of cranking and starting the diesel engine. The four generators are connected alternately with four propulsion motors in a series propulsion loop circuit. Each motor has a normal service rating of 765 hp. at any speed over the range of 700 to 875 rpm. These motors are of construction similar to the propulsion generators with the omission of the starting winding. These main propulsion generators and main propulsion motors were designed to meet the general requirements of diesel-electric marine propulsion and to meet the specification requirements as to horsepower and service conditions for this particular

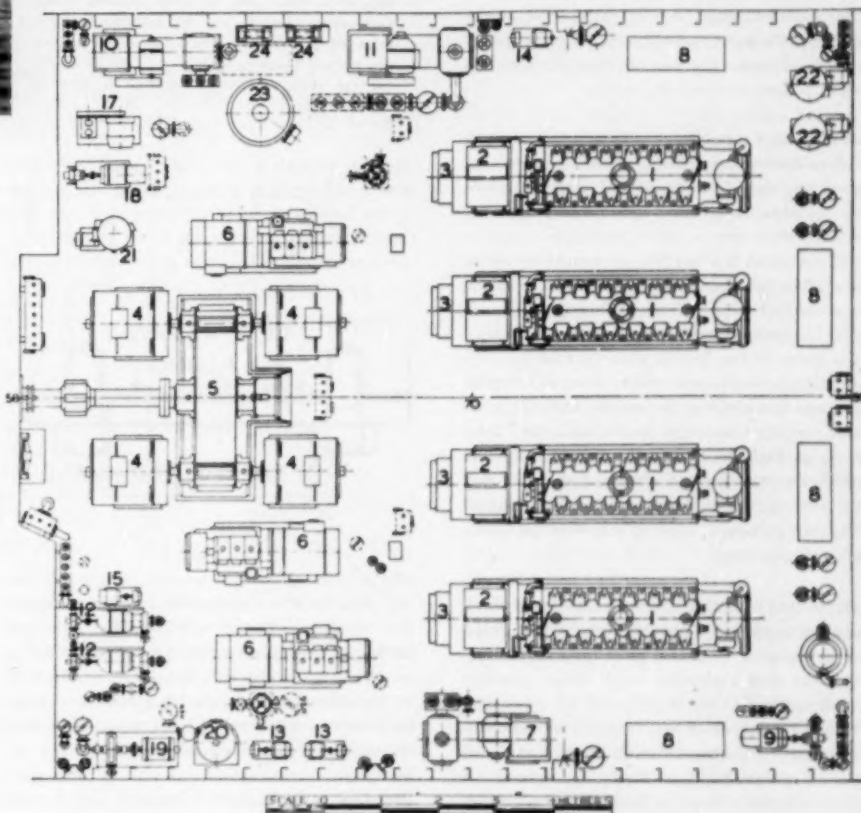


application. The four main propulsion motors drive the single propeller through a double-pinion, single reduction gear with a ratio of 6.25:1 to provide a normal service rating of 3,000 shp. over a range of propeller speeds from 112 to 140 rpm. A propulsion motor is coupled to the forward end and another propulsion motor is coupled to the after end of each pinion shaft of the reduction gear with the pinion shaft bearings supporting the one end of each armature shaft. The reduction gear assembly includes an integral propeller-shaft thrust bearing of the anti-friction type completely enclosed and lubricated from the reduction-gear oil system. The various units of the propulsion excitation and control equipment were designed to comply with the general requirements for marine service, the particular requirements of this installation, and the expected operating requirements of the vessel. Each main propulsion generator assembly includes an overhung integral auxiliary generator with suitable regulating equipment and of sufficient capacity to permit an output of 24 kw. at 120 volts direct current over a speed range of 375 to 750 rpm. Under normal operating conditions, where four propulsion engines are in use, one of these auxiliary generators is operated as a constant voltage source of excitation power for the main propulsion motors and for general control power; another auxiliary gen-

erator is operated as a variable voltage source of excitation power for the main propulsion generators; the other two auxiliary generators serve as standby units for emergency service.

Protection is provided for the propulsion equipment against possible motorizing of the generator and its engine should a fault develop in the engine and prevent its functioning as a driving unit. This protective device operates when the engine is driven by its generator in the reverse direction at a speed not greater than 50 rpm. and discontinues the excitation on the field of that generator to prevent further motorizing at higher speeds. When this protective device has operated, it is intended that the respective generator be switched out of the series propulsion loop circuit, after which the protective device may be reset by means of a reset pushbutton on the control cabinet. After the engine fault has been corrected, the generator may be switched back into the loop circuit.

The requirements for ship's power for other than propulsion purposes are provided for by three General Motors Corporation diesel engines driving 100 kw. direct current generators. These generator sets may be operated in parallel, in any combination as required by the load conditions, and in case of emergency or, when only a single propelling engine is in service, may be used as a source of excitation power for the main propulsion motors and general propulsion control power.



Engine-room plan of the "Mul Ann."

- 1.—Main engines. 2.—Propulsion generators. 3.—Exciter generators. 4.—Main propulsion motors. 5.—Main propulsion reduction gear. 6.—Auxiliary engines. 7.—Ballast pump. 8.—Lubricating oil filters, main engines.
- 9.—Fuel oil transfer pump. 10.—Bilge pump. 11.—S.W. ballast pump. 12.—Comb. lub. oil and sea water pumps.
- 13.—F.W. pumps. 14.—S.W. pump. 15.—S.W. sanitary pump. 17.—Air compressor. 18.—Lub. oil transfer pump.
- 19.—Fire pump. 20.—Emergency cooling pump. 21.—Lub. oil purifier. 22.—Fuel oil purifiers. 23.—Donkey boiler. 24.—Steam feed water pumps.



High-Speed Diesels ... Design, Operation & Maintenance

CONDUCTED BY H. G. SMITH

OIL LEAKS

ONE of the frequently discussed problems of all gasoline or diesel engines is oil leaks. Leaks of any kind, water, gas, oil or fuel, are costly and quite frequently dangerous. A bad oil leak may lead to burned out bearings or even a total wreck.

Oil is expensive, so let us try to keep it where it belongs—in the engine.

Although oil leaks are with us constantly, to a more or less degree, they don't need to be. Generally speaking, oil leaks come from bad gaskets or badly worn oil seals. A poor design also enters into the problem, but usually it is the parts rather than the design unless it becomes chronic, and then it is time to study the design.

Not long ago I was talking with a fellow who had purchased some war surplus diesel engines. He stated that out of the lot, two of them were terrible leakers. They leaked all over and he could not understand how a reputable engine company could put out such a bad job. He was asked where the engines had been and what was their history. He could not supply much information, but it could be assumed that they had probably been some place in the Pacific area because he purchased them on the west coast, which a lot of us know was the dumping ground for such material. These engines were no doubt suffering from shrunk gaskets and dried out oil seals, because he said that all the bolts and screws had been tightened several times without success. Speaking of dried out gaskets, let us go into this subject a little more in detail.

Gaskets used in various places in high speed diesel engines are made of plain pulp wood paper, hemp and jute papers treated to give toughness, flexibility and imperviousness to oil, water, gasoline and other liquids. Asbestos is used for other gaskets after it is mixed with natural or synthetic rubber, and granulated cork is another material which is compressed into sheets and bonded together with some suitable bonding agent. Other materials have been recently developed using synthetic rubber impregnated into steel sheets. The greater portion of the paper gaskets are the hemp and jute base, known by various trade names, and these are treated with glycerine and glue. The

H. G. Smith's background in diesel engineering renders his articles of great interest to those engaged in operation and maintenance of high-speed engines. From the Springfield, Ohio, Technical and Engineering school, he entered the Foss Gas Engine Company, Springfield and later, Springfield Motor Truck. With this experience behind him, he joined Hercules Motors Corporation, where he was chief engineer for many years being with them when their diesel program was started. Executive engineer for Buda during the last ten years, he recently resigned to take up consulting work.



glycerine is used to make the paper pliable and flexible and the glue to give it toughness and act as an additional binder. Properly stored and handled, they are very good, but if stored where they are subject to heat, the glycerine will evapo-

where the temperature will not exceed 100 or 150 degrees, but they are not very good for water joints. If the spot on the engine exceeds these temperatures, it is best to use a more satisfactory material such as the asbestos type.

Two things must be constantly kept in mind when dealing with paper gaskets. Store them where they will not be subject to elevated temperatures and where it is not too dry. Secondly, if you find upon checking your stock some of the gaskets are dry and brittle, they should not be used. During the last war there were large shipments of these gaskets made to all parts of the United States and many foreign countries for the armed services. Some of these same gaskets, in fact large amounts of them, returned to commercial use and found their way into general distribution. There is a possibility that even today some of them are still available. Some of these gaskets may still be in good condition, but the chances are they are not what they should be. Check your stock and if you find any that are hard or brittle, it is better that they be disposed of and replaced with fresh stock.

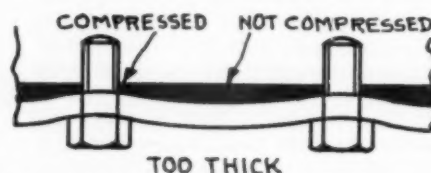
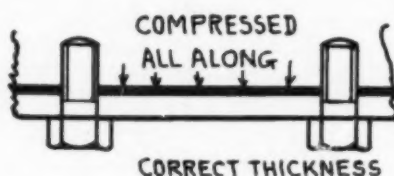


FIG. 1

rate and the gasket will become hard, brittle and will shrink. It is quite obvious that a gasket in this condition will not seal properly and some mechanics try to restore them by soaking them in water. Such soaking will make them pliable and let them stretch, but once the glycerine is gone, such soaking only prolongs the time before they will again shrink and cause trouble.

The plain paper gasket, untreated, can be used where there is no hot oil or water or no great pressure. Treated papers, mentioned above, are quite satisfactory if the surrounding temperature is not too great and the pressure is not too high. It is usually considered good practice to use them

Don't buy any so-called cheap gaskets. Get them from a reputable dealer and then be sure to properly store them in a cool but not dry place.

If you have the occasion to replace a gasket and the proper piece is not available and you cut it from a sheet, be sure the sheet is fresh and the proper grade. Avoid using any sheet that is not as good a quality as is needed.

We do have the problem of loose screws and bolts, causing the gasket to leak. If after tightening the screw the leak continues, the parts should be disassembled to see if the gasket has been folded or if the surrounding pieces are distorted.

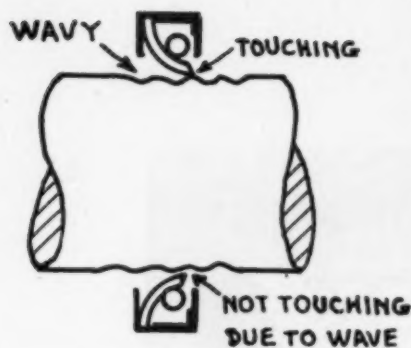


FIG. 2

Another thing about gaskets, some maintenance men are tempted to put in a thicker gasket when a leak occurs, figuring that if a 1/64-inch gasket

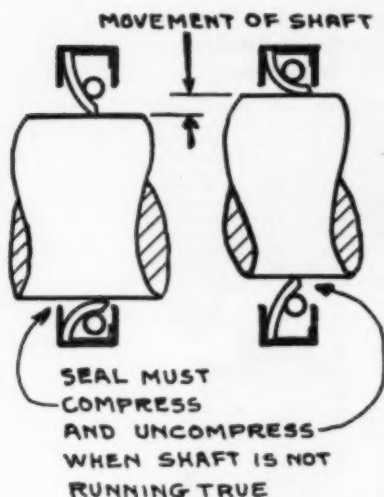


FIG. 3

does not stop the leak a thicker gasket should do the job. This does not happen very frequently, but to those of you that may have done this or may some time think of doing it, a little word of advice. Gaskets compress, and by using too thick a gasket, the gasket will compress around the holding screws and if the part can bend, it may not seal the space where there are no screws. This is especially true where you have pressed steel or aluminum parts. The result will be as shown in Figure 1. Cork gaskets are usually 1/16-inch thick or more, and if the backing piece can bend or distort be careful not to use too thick a gasket.

Some notes about oil seals. They are used to seal the oil from coming out around the crankshaft and other extending shafts driving external accessories, and are subject to hot oil, but not to too much pressure. Some are made of treated leather and others are made of natural and synthetic rubber. Those made of leather should be soaked in thin oil before using. The leather usually is treated by

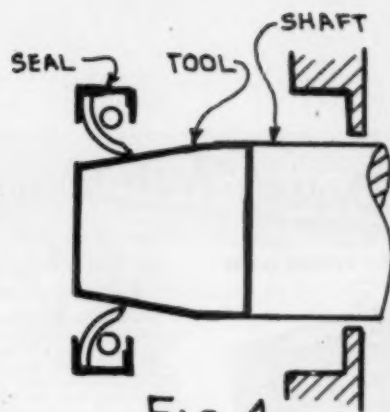


FIG. 4

the manufacturer to prevent drying out, but if stored for any length of time they have a tendency to dry out. Soaking in oil before using will usually restore them to their original condition.

The main solution to good oil seal performance is the surface upon which the lip rubs. The shaft surface must be smooth and polished, and, if upon replacement the leak still persists, the surface should be carefully checked. If it is smooth but is still wavy as shown in Figure 2, it should be replaced or restored to its original diameter.

The oil seals around the crankshaft have a big job to do. The crankshaft is not moving in a true concentric path because the shaft is supported in bearings that are two, three or four thousandths larger in bore than the shaft diameter, which

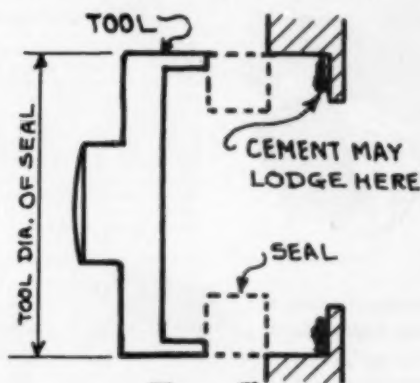


FIG. 5

means an unconcentric path for the oil seal. See Figure 3. The seals are usually made with a spring backing or have a lip which is so constructed that it will flex with the shaft movement. A properly constructed seal will easily take care of these small movements, however, there is a limit to the amount and the condition becomes quite serious when the supporting shaft bearings become badly worn. The seals are also subject to considerable heat, caused by friction and radiation from other parts of the engine. For this reason oil seals need oil just the same as any other rubbing part and if a slight moisture appears on the oil seal lip you should be happy—the oil seal is.

Seals wear out just the same as other parts that are rubbing together. It is a little difficult to determine how much longer they will continue to operate satisfactorily, so it is a good practice to replace all oil seals at the time of any major overhaul even though they may appear to be in good condition. Generally gaskets are replaced at such times because they become torn or damaged, but the oil seals don't get such attention. Follow the practice of replacing them just the same as gaskets. It is good insurance against leaks.

A few more things about oil seals are worth repeating and pertain to their installation and handling. The lip of the seal is the operating part of it and when sliding the shaft into it, or sliding it over a shaft, be sure that the lip is not damaged or bent in any way. If the shaft has a sharp edge on the end of it, obtain a tool which will butt against the end of the shaft and have a taper on the other end. See Figure 4 for more detail. This tool will gradually expand the seal to its proper size without distorting the lip.

Seals should never be installed in their bore by ordinary hammering. The casing of the seal is easily distorted. For driving in place, use a hollow piece of pipe or tool having a square flat end that will rest on the outer casing of the seal. Fig. 5.

Generally speaking, it is not necessary to use any gasket cement on the outer casing. The press fit for proper holding is built into it. If cement is used it may get into the seal or lodge back of the casing and prevent its resting squarely in bore.

All of these things are quite simple but very important to prevent leaks and provide a clean tight engine. Don't forget, however, that a slight moisture around the lip of an oil seal must be expected and such a seal will have a good life.

Dieselizing Passenger Service

The St. Louis-San Francisco Railway (Frisco) has ordered fourteen diesel passenger locomotives, which will permit it to dieselize two-thirds of its passenger service. The locomotives will be placed in service just as they are received, estimating that it will be mid-1950 before all are delivered. At the same time orders will be placed for 27,500 tons of additional heavy rail or enough to lay 125 miles of track.

New Edition of the Johnson Bronze Catalogue

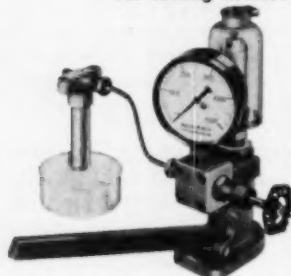
The new, revised 1950 edition of the Johnson Bronze Company's industrial bearing catalogue is now available. In this catalogue, the section covering the electric motor bearings has been enlarged due to the demand of the trade. The standard stock size of plain bearings and the size and range of the bars remain the same. Every item in this catalogue is immediately available in any of the Johnson Bronze twenty-two sales offices and warehouses throughout the country.

BACHARACH***Diesel Testing*****INSTRUMENTS****For Testing Compression Pressures of a Running Engine**

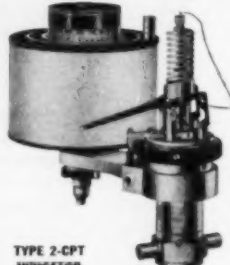
Compression is measured by trapping the cylinder pressure by means of a check valve and measuring the pressure trapped above the check valve with a pressure gauge. Instrument is easy to connect to any make and model of Diesel engine merely by removing the injection nozzle or injector unit and installing the proper MOTORITE Adapter in its place. A large assortment of adapters is regularly carried in stock.

**MOTORITE
DIESEL COMPRESSION TESTER****For Testing Firing and Compression Pressures at any Engine Speed**

Suitable for any engine provided with an indicator connection or where any other cylinder opening may be used for installing the indicator (opening for glow plug, relief valve, etc.). Indicator provides a convenience in checking compression and firing pressures that no other method can match. Reads as high as 1700 psi. accurately, regardless of engine speed or firing rate.

**MODEL VWF
INDICATOR****For Testing Nozzles and Injectors**

Designed to test accurately all types and sizes of Diesel nozzles and injector units. A large assortment of fittings and fixtures for convenient attachment of the injectors is regularly carried in stock. Push-button priming, automatic filtering of fuel, large fuel reservoir and precision manufacture are the reasons why this Nozzle Tester is preferred by Diesel engineers everywhere.

For Pressure-Time Diagrams at Slow and Medium Engine Speeds**TYPE 2-CPT
INDICATOR**

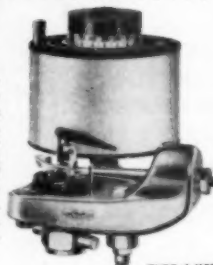
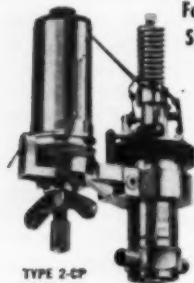
Eliminates need of indicator reducing motion for determination of m.e.p. and indicated horsepower. The pressure-time diagram also shows point of firing, ignition lag, rate of pressure rise after ignition occurs (burning rate) and compression and maximum firing pressures. Any Type 2-CP Indicator can be equipped with this Chronomatic Drum in the field.

For Exhaust Smoke Measurements

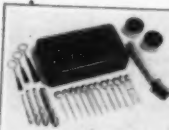
A portable, easy-to-use instrument for Diesel exhaust smoke measurements. An electrically driven vacuum pump draws a measured sample of exhaust gas directly from the exhaust pipe and passes it through a disc of filter paper. The carbon soot deposited on the filter paper is then graded by comparing the soot discoloration on the test disc with the shading on a standardized comparator scale.

**For Pressure-Time Diagrams at High Engine Speeds**

The only high-speed engine indicator available today for recording a complete pressure-time diagram in a single engine cycle. The diagram is traced on paper and is large enough for detailed study. A large assortment of pressure springs which are easily interchangeable, gives the advantage of great flexibility in the application of this indicator for test floor or field use.

**TYPE 4-HST
INDICATOR****For Pressure-Volume Diagrams at Slow and Medium Engine Speeds****TYPE 2-CP
INDICATOR**

Type 2-CP is the standard card-drawing indicator for medium and moderately high speed Diesel engines. It is equally well suited for gas engines, compressors and steam engines. Convenient interchangeability of pistons and springs make it possible to adjust the indicator for any desired pressure range up to 2000 psi. A special model is available for recording pressures up to 15,000 psi.

**Nozzle Service Kit**

This set includes the necessary tools for cleaning and general servicing of all popular makes of Diesel nozzles and injector units, all packed in a compact and convenient metal case.

**Indicator Valve**

This Forged Steel Valve is designed specifically for indicator work. Notable features: straight-through passage, automatic atmospheric release, fast opening and closing.

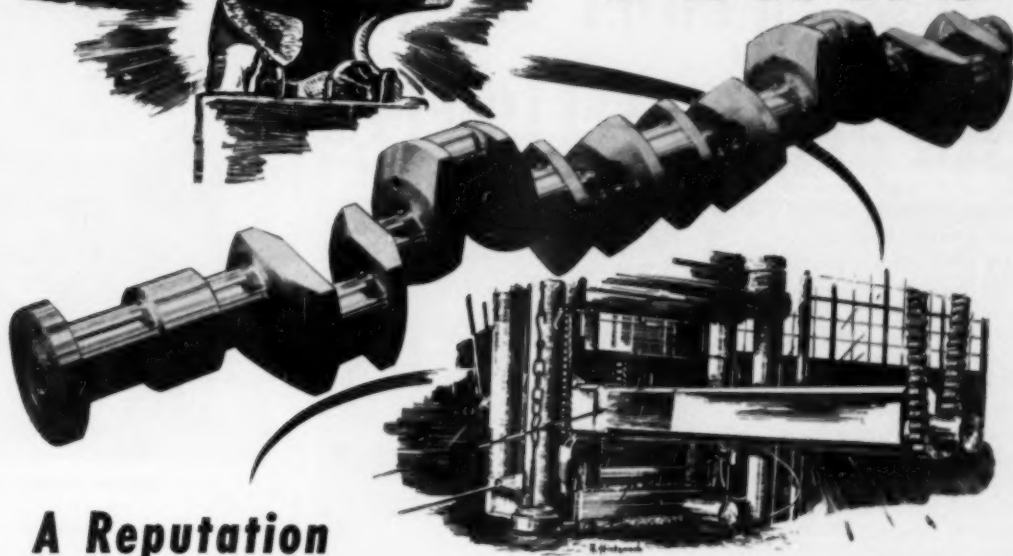
**Indicator Diagram Converter**

Mechanically converts pressure-time diagrams into pressure-volume diagrams. Adjustable for different lengths of P-T diagrams and for different connecting rod to crank ratios.

BACHARACH INDUSTRIAL INSTRUMENT CO. - 7000 Bennett St., Pittsburgh 8, Pa.



ACROSS THE YEARS



A Reputation for **DEPENDABLE, PRECISION WORKMANSHIP** **ERIE CRANKS!**

DURING the past half-century Erie Forge has built a reputation for dependable, precision workmanship. This period of time has seen many changes in the diesel industry . . . new designs, methods and materials. And during that same period Erie Forge has kept abreast of new developments . . . constantly striving to maintain or improve its high level of precision workmanship.

One control—one responsibility is the watch word at Erie Forge. From the raw material to the finished crank the work is under the watchful eyes of our engineers whose job it is to see that every finished product conforms to the high standards of Erie Forge craftsmanship.

Consult with our engineers. Together we will find the right answer.



ERIE FORGE COMPANY, ERIE, PA.





WHAT'S GOING ON IN ENGLAND

CONDUCTED BY HAMISH FERGUSON

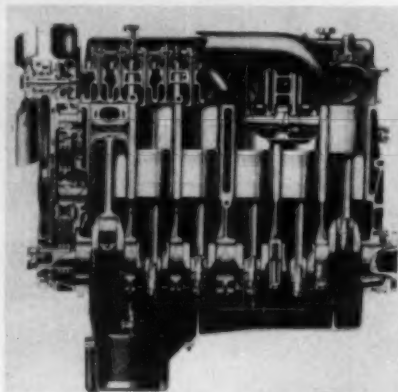
Hamish Ferguson was appointed Secretary to the Diesel Engine Users Association in London in 1944. Previously senior technical assistant to Diesel and Insurance Consultants, London, and for several years with English Electric Company in the designing and erection of large diesel generating plants. Mr. Ferguson continues to do independent consulting work.

IN this and subsequent news letters the writer will give some account of the activities of British manufacturers of diesels and accessory equipment from the aspects of design, new development and sales. The range of diesels manufactured in Great Britain is considerable and extends from the small 1½-hp. air-cooled type to engines exceeding 3,500-hp. in a single unit for industrial applications, and considerably larger units are built for marine purposes. The use of dual-fuel engines is steadily increasing, as is also the application of pressure-charging for both two-stroke and four-stroke types. A great deal of attention is being devoted to the modification of existing engines to enable them to operate successfully on heavier fuels than the gas oil in general use at the present time, and interesting developments may be expected. There is a tendency for brake mean effective pressures to increase with the extending adoption of higher supercharge pressures and bmep's exceeding 200 psi are now visualized. New transmission systems for both marine propulsion and rail traction have been developed, which are untried outside Great Britain, and these will be described as information becomes available for publication.

Associated British Oil Engines, this company, which is now also established in New York, announces new contracts for Peru and Australia. Three Mirreles engines, 740 bhp. at 360 rpm., will be supplied through G. Berchemeyer and Company of Lima for the rayon factory at Rayon Peruana, Peru. A further six sets comprising eight-cylinder supercharged engines, 1,320 bhp. at 375 rpm., will go to the State Electricity Commission, Victoria, Australia, and are a repeat of the order placed in September, 1949. All these engines will be direct-coupled to Brush alternators.

F. Perkins, Ltd., now established in their new factory at Peterborough, England, are going ahead in a really big way as manufacturers of diesels for vehicles and tractors of all kinds and their well-known marine engine is widely used and has been standardized by the Netherlands Navy. The company exports to 82 countries, including

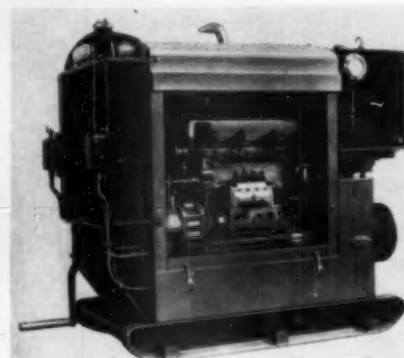
the Americas and the British West Indies. Employing over 2,000 workers, 75 engines are produced each day, 85 per cent of which are exported.



Perkins vehicle diesel.

The National Gas and Oil Engine Co. announce the arrival of their new "R4AU" series diesels, which have now completed an exhaustive program of tests. The eight-cylinder engine develops 600 bhp at 600 rpm when pressure-charged to 6.1 psi. A Napier turbo-blower is employed and for the industrial-type engine there is no air intercooling between the blower delivery and the engine inlet. The four-stroke engine with a four-valve cylinder head shows the remarkably low fuel consumption of 0.35 lb. bhp. hour at a bmep. of 130 psi. and exhaust temperature of 750°F.

W. H. Dorman & Co. Ltd. manufacture a range of engines extending from 10 to 100 bhp. for a wide variety of marine and industrial purposes. The engines are four-stroke of notably robust construction and operate at speeds up to 1,000 rpm. The portable four-cylinder unit adapted for belt drive to operate pumps, compressors or generators is to be seen on many sites where civil engineering works are in progress and Dorman engines are also fitted as standard in various well-known makes of excavators, cranes, dumpers and small locomotives.

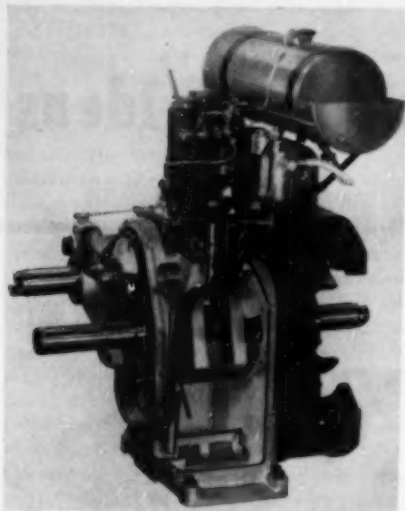


Dorman portable unit.

Crossley-Premier Engines Ltd. and Worthington-Simpson Ltd. have cooperated to produce a combined diesel-compressor set operating from a single crankshaft. The unit has been developed primarily to meet oilfield requirements for gas compressors. The crankshaft has three cranks in one plane, two cranks being connected to four power cylinders, arranged horizontally vis-a-vis, the third crank being connected to two compressor cylinders, also arranged vis-a-vis. Three standard sizes are manufactured, the largest developing 600 bhp. at 215 rpm. and producing 3,150 cf. of air per minute at 100 psi. A special feature of the compressor is the use of Worthington feather valves, which are claimed to be the lightest, simplest and most efficient ever developed for compressor work. Each valve consists of light strips of steel whose easy flexing permits passage of air. The valve seats merely by increasing contact from each end to the center rather than by destructive impact.

Armstrong-Siddeley of Coventry are now producing their range of small air-cooled engines which comprise a complete light-weight unit of the four-cycle type. The fuel tank and all accessories are incorporated and the drive can be taken from either end of the crankshaft. Output varies from 5 hp. at 900 rpm. in the single-cylinder size to 16 hp. at 1,200 rpm. in the twin-cylinder model.

Guaranteed fuel consumption is 0.38 lb. bhp. hour and the weight of the 16 hp. engine, without fuel, is only 4.5 lbs. per hp.



Air-cooled Armstrong-Siddeley diesel.

"Hydropulsion"—this will be a new term to the majority of U. S. readers, for the word has only recently been devised to describe a new type of marine propulsion which has been successfully developed and put into operation for the first time. Several small engines are employed in a single vessel, each driving a rotary pump which supplies oil under high pressure to a hydraulic propulsion motor connected to the propeller shaft. Excellent results are being obtained in a tug operating on the River Thames and the system will be described in detail in a special article to be contributed shortly.

Booklet for Diesel Engine Users

The growing use of diesel-engined equipment of all kinds in South America, Canada, and South Africa, as well as the United States, is traced in separate features in the latest 24-page issue of "The Dependable Diesel," a magazine for power users published by the Cummins Engine Company, Inc. One section is devoted to "Canadian Industry Goes Diesel," describing the growing use of Cummins diesels in freighting, logging, petroleum fields, water works, and other industries, in that neighboring country. Other features include stories on the Wolf Creek Dam project in Southern Kentucky; on the Permanente Cement Co. operation; and on strip mining operations at the large Ayrshire Collieries holdings. Seven new engines introduced in the last 12 months to bring the number of Cummins models to 73 also are described in "The Dependable Diesel." Copies of the magazine can be obtained from Cummins dealers or Cummins Engine Company.

Diesel Engine Catalog is just off the press in its Fourteenth Edition. See the unique Diesel Horsepower Range Chart—invaluable aid to design engineers and buyers. ORDER COUPON ON PAGE 73.

Diesel Deliveries for Penn Railroad

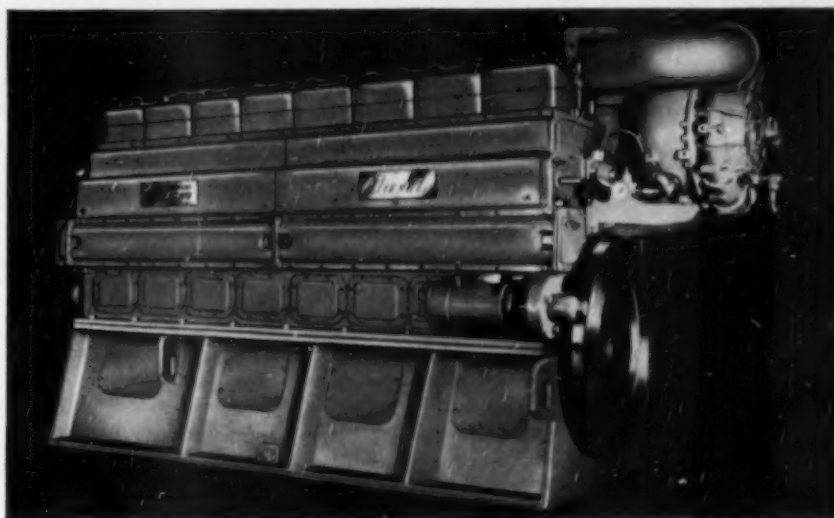
Deliveries have already begun on Pennsylvania Railroad orders, placed two months ago, for 226 new diesel-electric road switching locomotives. Twelve 1,000-horsepower switching locomotives have been delivered and placed in service last December. Deliveries of road locomotives began in February when nine freight locomotives are scheduled for service, out of the order for 45. Delivery of the five-passenger road locomotives included in the order will begin this month and be completed next month. Of the 176 switchers covered by the order, 37 more were expected in February, and

25 in March. By early summer most of the new engines will be in service. The new locomotives, costing \$38,000,000, will increase the Pennsylvania's diesel fleet to 820 locomotives, totaling 1,433,100 horsepower, making the railroad the largest operator of diesel locomotives.

Production Manager at Hunt-Spiller

A. J. Edgar, general manager, Hunt-Spiller Manufacturing Corp., Boston, announces the appointment of R. G. Fredette as production manager. Mr. Fredette was formerly associated with Raytheon Manufacturing Corporation.

More POWER... Less SPACE WITH STERLING VIKING DIESELS



This 8-cylinder turbo-supercharged Viking Diesel is conservatively rated at 750 hp. Sterling Diesels are available in five different models beginning at 100 hp.

DIESEL POWER for all INDUSTRY

AUTOMATIC POWER PLANTS
DRILLING RIGS — HOISTS
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GENERATOR SETS
FISHING CRAFT — DREDGES
LIFT BRIDGES — TOW BOATS
COMPRESSORS — AIRPORTS
VENTILATING SYSTEMS
PUMPING STATIONS
SHOVELS



STERLING ENGINE COMPANY

1270 Niagara St.

Telephone Lincoln 0382

Buffalo 13, N. Y.

Sterling Viking Diesel Engines from 100 to 750 hp.—Sterling Gasoline & Gas Engines from 100 to 600 hp.

E

Exchange Your Diesel Maintenance Ideas

CONDUCTED BY R. L. GREGORY

FACTORS GOVERNING GOOD MAINTENANCE

ONE of the factors in keeping plant operating costs at a minimum is that of proper maintenance. Successful plant maintenance depends upon several varying conditions and items, but to sum it all up, the three most vital points consist of a well planned periodical inspection, which should include concise and accurate records of each inspection, the maintenance personnel and proper equipment and tools to carry on the required work of repair.

As to the length of these inspection periods, most of them depend upon operating schedules, type of load demand, reserve generating capacity and age of equipment. Most diesel manufacturers base the inspection periods upon operating hours, which to the writer's way of thinking is the proper method on units which are operated on a daily basis. However, where one has standby units, which are only operated intermittently, it would

seem that the inspection periods should be based more on a time elapsed basis, such as semi-annually or annually.

This was brought quite forcibly to the writer's attention during the late war. One plant of my acquaintance had a couple of standby units which had been idle for months, due to the fact that larger units had been installed just prior to the war and were in daily operation. These units were more efficient and had ample capacity to care for the plant load demand. But one day one of them developed unforeseen difficulties which caused the operating personnel to remove it from service.

When they attempted to put the standby units in operation, that had been idle for several months, they ran into all sorts of trouble. The result was that part of the load had to be dropped for several hours until this trouble could be corrected.

What had actually happened was that during this long period of idleness, fuel injection equipment had become corroded and clogged, sludge had formed and settled in lubricating lines, thus preventing lubricant from entering the ports on the cylinder walls, causing the pistons to more or less stick and all in all left the units on the shelf as far as putting them into service on short notice. Where they had made the mistake was not in turning the units on for a few minutes each week to keep them well lubricated and fuel injection equipment free and operative, even though they did not need the units for actual plant operation. This type of trouble could have been averted had the maintenance crew taken time to inspect this equipment periodically while these units were not being used. Records of tolerances, wear, general condition of all equipment are most important in good plant maintenance. It is a poor policy to leave such matters to memory. Actual conditions

Fig. 1

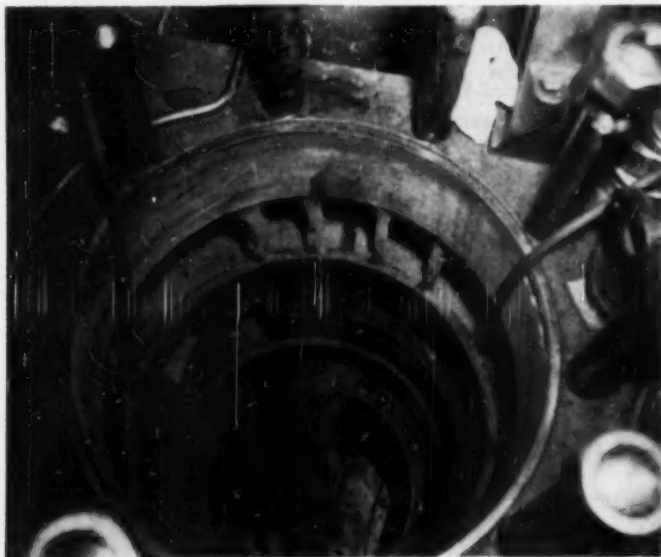
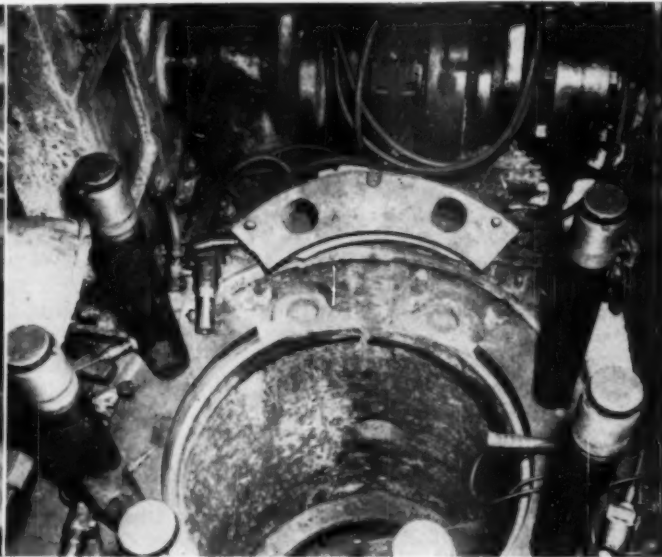


Fig. 2



and figures should always be recorded in a record book, then there is no argument as to what conditions were corrected and what repairs made.

This depends upon maintenance personnel. A good maintenance crew is not only interested in such records but insist that they be properly kept. With this knowledge at hand, they are forearmed with the proper information from one inspection period to another. One may have an excellent mechanical crew, but if they haven't information in the proper form, they can consume a lot of valuable time in checking and re-checking equipment, before they get down to the actual work of repair. The operating personnel being in constant contact with the units while in operation, can be of great assistance to a maintenance crew during the periods of inspection and repair. Just how they can be of assistance is discussed under the Supervisors section in the February issue of DIESEL PROGRESS. Last but not least is the proper tools and equipment for use of the maintenance crew in making repairs. One cannot expect a satisfactory job from any maintenance crew which is handicapped by poor tools and working equipment. Certainly, the first cost of a lot of these items may look high, but when they are used on repair job after repair job, the savings on both labor and time taken into account, one can readily realize the value of such an expenditure.

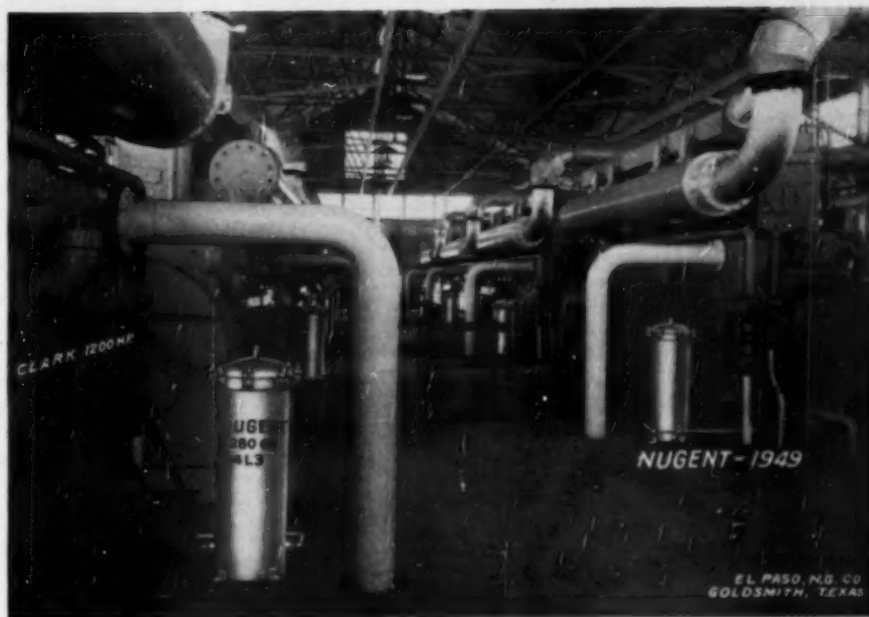
In one of the recent issues of DIESEL PROGRESS the writer discussed at some length the repairs made by metallocks in preference to welding. Figures 1 and 2 show repairs being effected by maintenance crews with this method. Figure 1 shows a cylinder block with liner removed. Note the piece that has been removed from the block and the piece being prepared to insert in its place. The cost of such a repair was far under that of the purchase of a new block and when completed was equally as efficient as a new block.

Figure 2 is similar in that this repair was effected by this method. Two studs at the top of the picture were broken off and the flange cracked. The section of the flange was removed, the broken studs taken out and replaced and locked into position. This repair was just as effective and the cost of the repair was far lower than that of a new section of the unit.

To effect such repairs, the maintenance crew had to be equipped with proper tools, which you will note are in the way of chipping hammers, electric drills of suitable size, air grinders, etc. But when the repairs were effected the tools were cleaned up, put away and ready for use on a future job, and the maintenance crew knew that they had proper equipment on hand to effect repairs of this nature.

In the next issue of DIESEL PROGRESS, the writer will discuss further the matter of tools and equipment and show some actual photographs of a maintenance crew that is using tools they designed to help cut the costs of maintenance and repairs. Most of these tools were made from parts found around the plant, which are assembled with a minimum of time, yet saved hours of labor and outage on the units.

Clean oil means longer compressor life



with **NUGENT** ABSORBENT OIL FILTERS



Nugent Absorbent Oil Filters get out more of the harmful impurities that get into oil—99.8% by actual test and cleaner oil means that engines, compressors and all machinery will last longer and require less maintenance, while at the same time require less frequent replacement of oil.

Fig. 1280CF, the Nugent Filter type shown above installed on engine-compressor units at the Goldsmith, Texas, station of the El Paso Natural Gas Company, is typical of Nugent depth type pressure liquid filters. The filtering material generally used is a superior quality of cotton waste, wool, excelsior, asbestos or cellulose. No chemicals, bleaches or filtering earths are used. All units have very large capacity for their size. Fig. 1280CF is available in a wide range of capacities. Write for complete information.

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FOR many years the battery industry has supplied users of diesel starting batteries with curves and charts designed to help select the correct battery for the job. It is felt, however, that many purchasers do not apply this helpful information which is available to them. For this reason, the Laboratories of the Gould Storage Battery Corporation have prepared the accompanying typical discharge characteristic curves and explains how to use them.

The number of lead-acid cells required to operate the motor needed to start a diesel engine is determined by the designer of the diesel engine. If, for example, the starting motor of a locomotive diesel is designed about a 64-volt circuit, a 32-cell lead-acid battery is required, each lead-acid cell being rated at 2 volts.

But there is a lot more to it than that. The three principal considerations involved are: (1) the temperature at which the battery is to be operated, (2) the breakaway voltage required, and (3) the final voltage to which the battery can be discharged and still start the engine.

Knowing these factors (they depend on the design of the engine and starting motor) the discharge characteristic curves are used to select the correct battery. The graphs are prepared on a per cell basis since different diesel engines require batteries having different numbers of cells. The abscissa is marked off in amperes per positive plate. The reason for this will become apparent as the use of the curves is explained.

Typical curves are shown in Figures 1 and 2. If an initial breakaway voltage of 1.2 volts per cell is required, one would follow this coordinate out to the "initial volts" curve and then drop down to the "amperes per positive plate" ordinate. Knowing the total current required, say 2,000 amps for breakaway, the number of positive plates can be determined, in this case $\frac{2000}{180} = 11.1$, or 12 plates. For each positive plate there is an equal number, plus one, of negative plates. So the battery required would be a 25-plate battery. Battery plates are connected in parallel so the more plates, the more current available. Incidentally, this battery would discharge to a final voltage of .70 volts per cell in 2 1/4 minutes.

From Graph 2, if the battery was to be used in a northern climate, a 33-plate battery would be required.

Sometimes the selection of the battery depends on the final voltage, i.e., the voltage to which the battery can be discharged and still start the engine. This value, again, is determined by the design of the starting circuit. For example, if the final voltage of a battery required to deliver 1200 amperes is not to be below 1.00 volts per cell at 77°F., a 21-plate battery would be required. This battery would have an initial voltage of 1.40 volts per cell and would discharge to a final voltage of 1.00 volts in 4 minutes. At 32°F. a 31-plate battery would be required.

If the battery indicated does not fit the space limitations, then the same procedure would be

HOW TO SELECT THE CORRECT DIESEL STARTING BATTERY

By DOUGLAS SHEARING

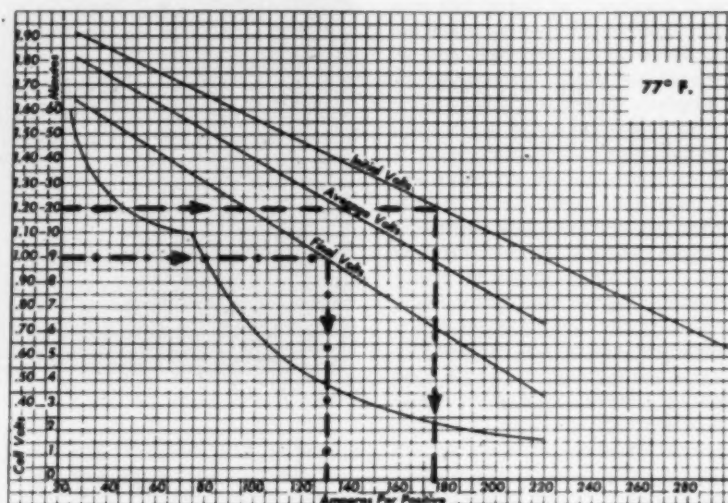


Fig. 1 (Above)

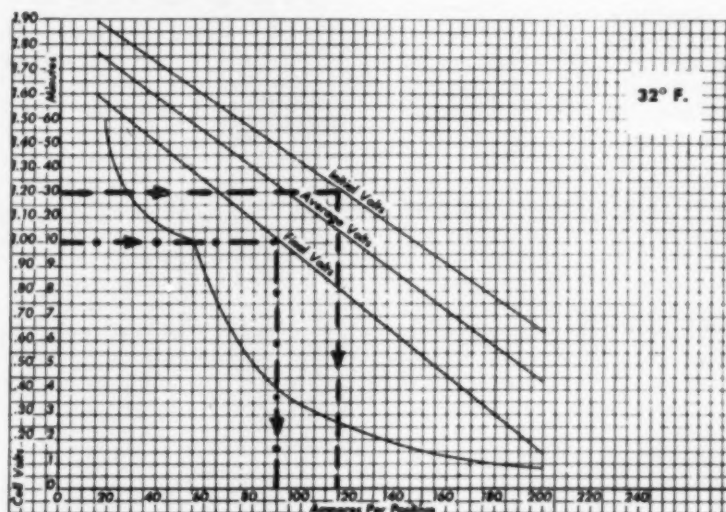


Fig. 2 (Below)

followed using discharge characteristic curves of other battery models until a battery fitting the space limitations is met. Because of the size and weight, incidentally, batteries are assembled in units of three or four cells. This not only makes

it easier to handle the batteries in confined spaces, but also makes it possible to stow sections of the battery in several locations. Since cells are connected in series the current remains the same regardless of the number of cells used.

Trans-Continent Diesel Haul



From Middletown, Pa., all the way across the United States and Canada to Fairbanks, Alaska—that's the long road ahead for this Autocar low-bed powered with a 200-hp. Cummins diesel and carrying a 31,000-pound fire engine. The owner of the hauling unit, W. J. Brougher, of Somerset, Pa., reports that he contracted to make this run on an experimental basis, and expects to complete the job in two weeks. The fire engine will be delivered to a U. S. Air Forces Base in Alaska.

Merchandising Manager for Marley Co.



Robert L. McFadin has been named manager of the merchandising sales department of the Marley Company, Inc., and as a result has transferred to the main offices of the company in Kansas City, Kan. For the past year he had been in charge of merchandising sales in the New York office, and in his new position will have charge of such sales for the entire Marley organization. After his graduation he joined the Carrier Corporation and then became associated with the W. T. Grant Company as an engineer in charge of air conditioning. McFadin has been with the Marley Company since March, 1948.

Eastern Manager for Worthington



A. M. Boehm The appointment of A. M. Boehm as Eastern Manager, Engine Division, has been announced by John J. Summeraby, vice president in charge of sales, Worthington Pump and Machinery Corporation. Mr. Boehm will handle sales negotiations for gas and oil pipe lines equipment and oil and gas engines for all services, and will continue to make the corporation's New York district office his headquarters. Mr. Boehm has served Worthington for twenty-five years as an engine sales specialist assigned to various district offices throughout the country. He succeeds W. L. Russell, who has been assigned to handle Canadian sales for the John Inglis Co., Worthington's Canadian associate.

Diesel Engine Catalog is just off the press in its Fourteenth Edition. See the unique Diesel Horsepower Range Chart—invaluable aid to design engineers and buyers. ORDER COUPON ON PAGE 73.

General Manager of Delco-Remy



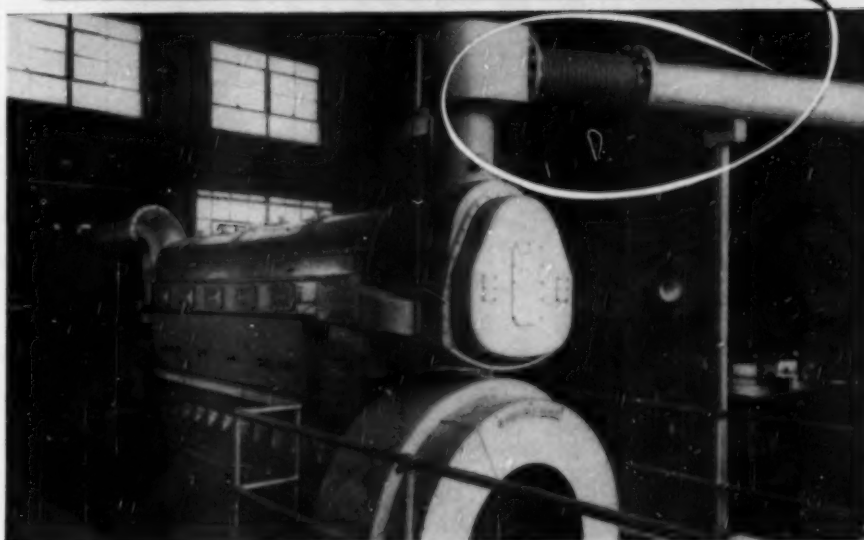
H. D. Dawson H. D. Dawson, Assistant General Manager of Delco-Remy Division of General Motors since 1947, has been named General Manager of the Division, succeeding O. V. Badgley, whose retirement was effective January 1. Mr. Badgley had served with Delco-Remy 41 years. Announcement of Mr. Dawson's appointment was made by General Motor's president, C. E. Wilson. As manager of

Delco-Remy, Mr. Dawson will direct activities of one of G-M's largest accessory units. The Division has nine plants in Anderson, Indiana, and operates automotive storage battery plants at Muncie, Indiana, and New Brunswick, New Jersey. Total employment of the Division is approximately 13,500.

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CMH Flexible Connectors for Internal Combustion Engines



Connector problems for internal combustion engines are solved efficiently and safely when you use CMH Flexible Connectors. They absorb expansion and contraction . . . correct for misalignment . . . control vibration. CMH Flexible Connectors require no maintenance—all metal connector and coupling assembly needs no packing, does not leak. Safe, dependable and long-lived for exhaust lines or air intake. Available in choice of steel or stainless steel

with flanged or welding ends. Standard diameters from 1 inch to 30 inches.

In its complete line of flexible metal hose products CMH also manufactures lines for fuel, oil, compressed air, water, lubrication, etc. Write for complete information.

Whatever the application, CMH Flexible Connectors give dependable service. In the installation pictured the connector is being used in the intake line to the scavenging blower of this diesel.

CMH—ONE dependable source for every flexible metal hose requirement

* CMH manufactures all standard types of flexible metal hose, both convoluted and corrugated, in a variety of metals; expansion joints for piping systems; stainless steel and brass bellows; various conduits and special assemblies of these components.

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Diesel Expert to Present Paper



Ralph L. Boyer

A comprehensive progress report of immense interest to all engine builders and operators is being presented at the World Power London Conference next July by Ralph L. Boyer, vice president and chief engineer of The Cooper-Bessemer Corporation. Prepared at the invita-

tion of the American Society of Mechanical Engineers, Mr. Boyer's paper covers the vital advances currently made in the design of gas and diesel engines having piston sizes of eight inches or more. Mr. Boyer points out that with modern diesel equipment today, efficiencies are constantly being improved to where fuel consumptions of .36 pounds per brake horsepower are not uncommon and economies as low as .34 pounds have been guaranteed. In gas engines, the improvement in fuel consumption has been much more phenomenal. Today fuel consumption as low as 6,590 btu. per brake horsepower hour is being guaranteed and thermal efficiencies of 40 per cent achieved.

Appointments at G-M Limited



T. N. Snyder



R. W. Sherk

T. N. Snyder, of Detroit, Michigan, and R. W. Sherk, of La Grange, Illinois, have been appointed respectively general service manager and general parts manager for General Motors Diesel Limited, London, Ontario, it was announced recently by Robert E. Hunter, director of sales. Mr. Snyder, formerly district engineer for General Motors Electro-Motive Division and located in Detroit, will make his headquarters in Montreal. He will have charge of all the company's service activities. Mr. Sherk was associated with General Electric Company and with Buda Engine Works prior to joining G-M Electro-Motive Division. He was parts merchandising manager.



**A LINEN SUIT
IN A BLIZZARD?**

WHY, THE MAN HAS HOLES IN HIS HEAD!

You can't protect yourself against a mid-winter storm with a light summer suit . . . and you can't protect your fuels and lubricating oils with inadequate filters. It's as simple as that. Yet, there are some men who try. They try because they think they can save a few pennies, but instead of making a saving, sooner or later they lose their shirts . . . right out from under their linen suits.

When you're in the market for filters . . . it pays to ask a few questions. How much dirt will the filter actually stop? After it stops the dirt, can the filter hold it? Is the element designed to filter really *dirty* oil, or just *clean* oil? Is the element designed so that its surface will continue to provide efficient filtration over a reasonable period of time, or will it

quickly become clogged and coated and cease to serve its purpose? Is your particular job adequately performed by just one filter, or should it require more than one? And last but not least, are you getting the *right size* filter to give your equipment sufficient protection?

Winslow elements are built to filter *dirty* oil, to eliminate the *dirt that hurts*. They aren't laboratory filters. They are filters built for hard, day-after-day service in actual operation. They save you *dollars*, not *pennies*.

Winslow Filters eliminate the largest particles of dirt first, and then progressively catch and *hold* smaller particles as the oil passes inward toward the center core. There is no premature clogging, no buckling of the element, allowing dirty oil to by-pass it.

If you are interested in complete safety and satisfaction, with lasting economy, write to Winslow today for further details.



WINSLOW FILTERS

AD W-808

Winslow Engineering Company

4069 Hollis Street • Oakland 8, California

Heavy Duty Quick Coupling



A quick disconnect coupling in a 6-inch pipe size for heavy duty applications is a new development of Roylyn, Inc. This new coupling, known as the 1700 series,

is design to meet rigid requirements of heavy industry for a large coupling that is fast connecting and fast feeding, also easily operated without tools. Compactness and portability are assured with a dimension between flanges of only 7 inches and a weight of only 17½ pounds. The coupling is rated at 150 psi. A 40 degree turn is all that is required to make or break the coupling. Locking is affected with ½-inch stainless steel balls, and mating parts are tapered for "no-jam" connection. The seal ring is of synthetic rubber and is easily replaceable.

Bulletin on Torque Converters



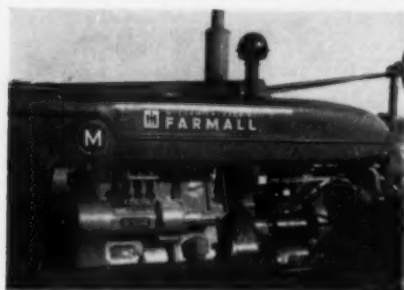
In the fall of 1948 Detroit Diesel Engine Division of General Motors Corporation announced the availability of Series 71, 2-cycle diesel engines with torque converters

for use in industrial power machinery. Now, they have available *both* the diesel engine and the torque converter as a combined unit. An informative story of this new unit is told in a new publication, profusely illustrating the engine and the converter and how it functions.

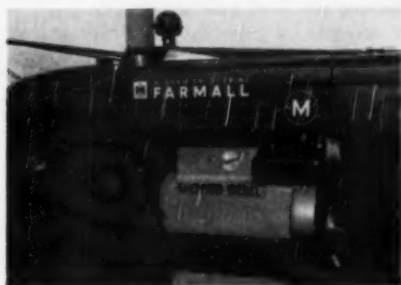
New Diesel Conversion Kit



At the recent 34th Annual Pennsylvania Farm Show, R. H. Sheppard announced the addition of a new three-cylinder, full-diesel engine to their line of diesel farm tractors and diesel engines. The new diesel, Model 6M, is actually a complete conversion kit designed and produced for the express purpose of converting Farmall "M" gasoline tractors to full diesel drive.



The new Sheppard 6M Conversion Kit is unique in that it is the first such unit to be engineered and produced for sharply defined purpose. While this unit will fit the W6, MV, O6, OS6, I6, T6 tractors and the Model U6 power unit, it was produced principally for the conversion of the Model M gasoline tractor to full diesel. Of particular interest to users of this conversion kit is the fact that installation of the full diesel engine in the Farmall M tractor requires less than a day's time. No special tools are required for the change over, all required parts are contained in the conversion kit. Also of importance is the fact that installation of the diesel does not alter the physical dimensions of the Farmall M in any way. All implements designed for the use with the gasoline M can be used with the tractor after change-over to full diesel.



Specifications for the Sheppard 6M Conversion Kit are as follows:

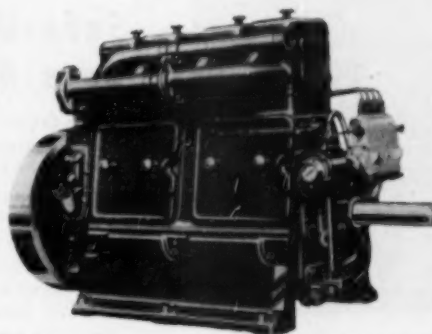
Model number	6M
Bore	4 inches
Stroke	5 inches
Number of cylinders	3
Horsepower	Same as new gasoline M engine
Cam shaft	Gear driven
Exhaust pipe diameter	2 inches
Number of main bearings	4
Fuel	Domestic furnace oil or diesel
Weight of engine	980 lbs.
Maximum engine speeds	1650 rpm.
Full load speed	1735 rpm.
Ignition system	Full diesel

**"FIRST WE HAD One
NOW WE HAVE Two!"**

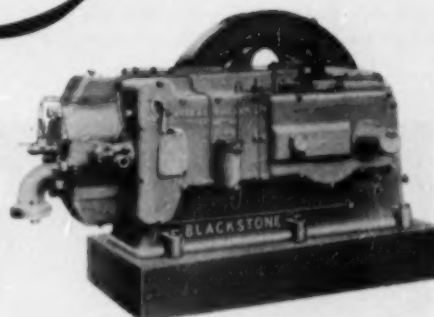
John C. Neilsen, Jr.
Neilsen Ice Cream Co.
Port Chester, N. Y.



YES, LISTER-BLACKSTONE Diesels are catching. Again, and again where one goes in, *others follow by invitation!* This is particularly true with regard to filling rigid power requirements for refrigeration.



ENGINE No. 2. Lister-Blackstone model 38/4, 40 HP., driving two ammonia compressors, 6'x6' and 5'x5'. Installed 1950.



ENGINE No. 1. Lister-Blackstone Model 5 P Horizontal, 50 HP., driving 7'x7' ammonia compressor. Installed 1942.

Success in producing superb quality ice cream and candy has substantially increased the production and power demands of the Neilsen Ice Cream Company, Port Chester, N. Y., who purchased their first Lister-Blackstone in 1942. An additional diesel has just been installed. "First we had one . . . now we have TWO!" says Mr. John C. Neilsen, Jr. Need it be mentioned that engine number two is also a dependable Lister-Blackstone?

NEW REDUCED PRICES

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Sold and Serviced in 37 Countries Throughout the World



Portable Ion-Exchange Unit

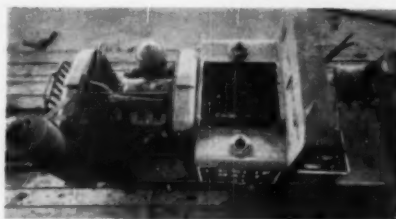


A new portable de-ionizing apparatus available to provide ideal water — free from harmful metallic content—for the industrial user of storage batteries. The new product, called the Deeminizer, delivers water of virtually total chemical purity,

which is essential to maximum battery life, in quantities up to five gallons per hour. Fed with ordinary tap water, it can yield a product with an electrical resistance of up to 10 million ohms per centimeter. Expressed in another way, this means that the water will contain only one part of ionic solids per 100 million parts of water, the equivalent of triple-distilled. Manufactured by Crystal Research Laboratories, Inc., the Deeminizer is a miniature ion exchange tower, weighing only 5½ pounds, and consists of a rigid polystyrene tube which accommodates a replaceable container filled with Deeminite. The tube is mounted on a metal base, requiring only 48 square inches of table space. In operation, a jar of "raw" water is up-ended in the top of the tube; the water passes through glass fiber filters which remove physical

impurities, then through the bed of resins which adsorb, or pick off and retain, the ionized metallic content which has a destructive effect on the lead plates of the battery.

Smooth Operation With Diesel Torque Converter Unit



Solar Evaporation, the salt producing process of antiquity, has been adapted to the needs of a modern world by the Leslie Salt Company of Newark, California. Here, sea water from San Francisco Bay is collected in large ponds, covering 25,000 acres of table land. The wind and sun turn out enough flat crystals to produce sizeable mountains each harvest season.

The production of crude salt by this age-old process is facilitated by some of the most up-to-date machinery and equipment available today. An extensive, narrow gauge railway system is used to

move salt from evaporation ponds to processing plant. Important to proper handling of this transportation problem is their Vulcan locomotive that was recently powered with a new 3-cylinder G-M diesel engine-torque converter unit.



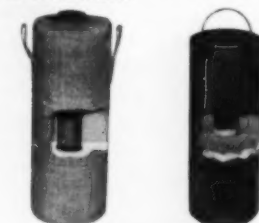
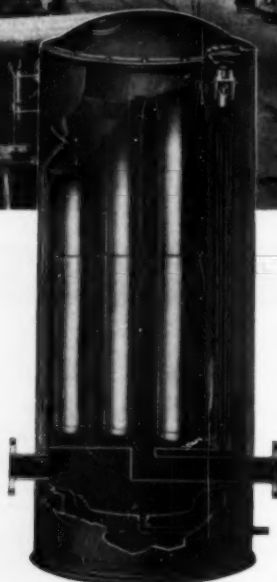
This power conversion provides the locomotive with the advantage of diesel economy of operation plus a high torque multiplication that makes it capable of getting heavily loaded trains underway smoothly and swiftly without gear shifting. This torque converter unit enables the train to gain speed for greater efficiency under light loads.



Specify HONAN-CRANE



In this plant Honan-Crane Purifiers are direct connected to twenty-four 1,000 HP Cooper-Bessmers; nineteen 1,000 HP Worthingtons and eleven 1,450 Balthorn Jones engines... a total of 68,950 HP.



Honan-Crane Purifiers are available with both single and multiple cartridge-type, quick-change refills... using either cellulose fiber, or fullers earth purifying media.

Oil Purification for DIESELS

Proven Design Increases Safe-Use Life of Oil... Cuts Maintenance Costs

Honan-Crane Oil Purifiers are the choice of leading Diesel operators and engineers for purification of lubrication oils in Diesel Engines.

Honan-Crane purifiers remove abrasives, acids, sludges and all other types of damaging contamination... give maximum protection against bearing failure... extend safe-use life of oil, thereby reducing the need for frequent oil changes. Design characteristics of Honan-Crane Purifiers have been tested thoroughly for many years under all kinds of operating conditions.

On-the-job performance has proved that the best saves you most in the long run. Give your diesels the finest protection you can buy... specify HONAN-CRANE.

For complete information (or, a Honan-Crane resident engineer will call at your request)... write to Honan-Crane, 202 Indianapolis Ave., Lebanon, Indiana.

HONAN-CRANE CORP., Lebanon, Indiana
Subsidiary of **HOUDAILLE-HERSHEY CORP.**

One Diesel Pumps 15 Wells



J. F. Baker Oil Company, Texas, uses this unusual jackline hook-up on its oil lease in the Palo Pinto County. This installation, which is in a location most inaccessible during bad weather, is reported reliable and trouble-free as well as economical by oil well pumper. Pulling 17 lines through an oil well flat gear box, the 55-hp. International diesel pumps fifteen 1,700-foot oil wells. One rod is connected to the counter weight, another to a pump supplying water to living quarters. The engine burns natural gas and is operated 24 hours a day. It had been run continuously 3,600 hours without attention other than normal maintenance.

New Diesel-Driven Compaction Roller



Huber Manufacturing Company of Marion, Ohio, announces a new Huber Compaction Roller, developed in response to a demand of the construction industry for a unit especially designed to meet today's exacting compaction requirements. Thoroughly tested in more than a year of varied operations in the field, the new Huber compaction roller has a per lineal inch compaction of 5,387 pounds. It compacts 4,100 square feet an hour at an average speed of approximately two miles per hour. With a set of standard rolls, the Huber compaction roller can be converted to a conventional 12-ton 3-wheel type roller.

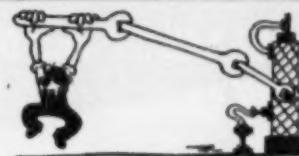
A Hercules 6-cylinder diesel engine with a 4 $\frac{1}{2}$ x-5 $\frac{1}{2}$ -inch bore and stroke and 529 cubic inch displacement drives this roller. The engine develops 118 hp. at 1,600 rpm., and has a force feed lubrication with an oil bath type air cleaner. It also has an automotive double clutch type transmission with speeds ranging from 1.8 mph. to 5 mph. in either direction. Bulletins are available at Huber distributors or write direct to the factory in Marion, Ohio.

Elected to Board of Directors

Joseph A. Martino, president of the National Lead Company, was elected recently to the Board of Directors of Allegheny Ludlum Steel Corporation. The two companies recently announced formation of Titanium Metals Corporation of America, a jointly owned company, organized for the development, sale and distribution of titanium metal, its alloys and products. Mr. Martino, yet to celebrate his fiftieth birthday, began his career with National Lead in 1916, getting his education by attending night courses at Columbia University. Rising through the ranks, he was elevated to

vice president in 1944 after serving for several years as controller and was elected president three years later.

Diesel Engine Catalog is just off the press in its Fourteenth Edition. See the unique Diesel Horsepower Range Chart — invaluable aid to design engineers and buyers. ORDER COUPON ON PAGE 73.



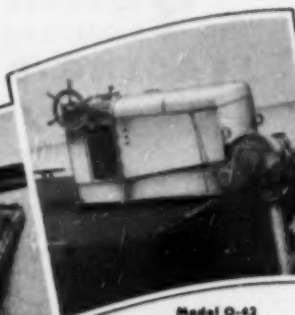
RESULTS BRING REPEAT ORDERS!



Model Q-4
165 H. P. Diesel
Reordered by
Morocillo Towing Co.



Model Q-7
300 H. P. Diesel
Reordered by
Cargo Carriers, Inc.



Model Q-43
40 H. P. Diesel
Reordered by
Standard-Vacuum Oil

HARBORMASTERS MEAN INCREASED PROFITS TO YOU!

Repeat orders mean satisfied customers — they mean that Harbormasters in actual daily work have earned increased profits for the operators.

Harbormaster models range from 20 to 300 H. P., gas or diesel, supplying heavy-duty propulsion and steering in one package.

Write or wire us today for complete details — save time and money, investigate Harbormasters.

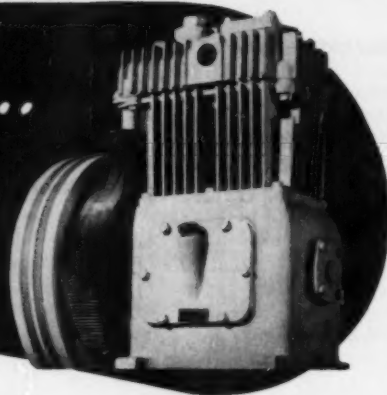
MURRAY & TREGURTHA, INC.

High Fidelity Marine Engines since 1885

6 HANCOCK STREET, QUINCY 71, MASS., U. S. A.

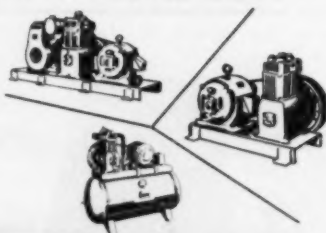
First for ...

**DEPENDABILITY
DURABILITY and DESIGN**



Quincy STANDARD CHOICE OF COMPRESSORS LEADING DIESEL MANUFACTURERS

Diesel starting requirements demand dependability and durability. Quincy Compressors are standard with leading diesel manufacturers because Quincy features assure dependable performance . . . long, trouble-free service life. Quincy Compressors are available in a wide variety of sizes 1 to 90 cu. ft. displacement, up to 500 lbs. discharge pressure. Units available as illustrated at right. Quincy manufactures air compressors exclusively.



QUINCY COMPRESSOR CO.

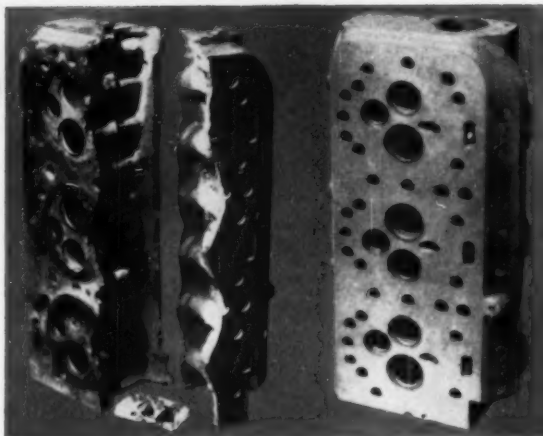
Dept. K-10, QUINCY, ILLINOIS

Branch Offices: New York • Philadelphia • Chicago • St. Louis • Dallas • San Francisco

*Let me tell you
about my
Operation!*



Note: Actually we don't supply pretty nurses as part of our RENEWAL service but everything else comes with the job.



"I had a cracked cylinder head — busted right down the middle. Dr. Guth operated — no pain at all — I feel fine. Ready to start life all over again. Let me tell you if your Diesel engine block cracks open and the case looks hopeless, call in Doc Guth for a prompt surgical welding job."

GUTH COMPANY
McPHERSON, KANSAS



SERVING THE NATION FROM IT'S CENTER

New Products for the Industry



The Anderson-O'Brien Company of California has on the market two new products. One being an automatic alarm system (left) and the other a compact,

emergency power plant. The Alarm-Air, as this alarm system is called, is a warning device operating an air horn from the air supply system through a solenoid valve. This unit contains its own long-life batteries which operate the solenoid when contacts are made by low oil pressure and high water temperature switches. A fuel pressure switch in series with the oil pressure switch may be used to prevent an alarm while engine is not running. A push button is provided to test the Alarm-Air as may be desired.

The emergency power plants are manufactured in ratings from 5 kw. to 100 kw. and are self-contained and weather-proofed for outdoor installation. These units can be used for any emergency power



purpose constantly or intermittently. A few of the important features of this power plant are that the fire-resistant insulated engine compartment is heated by normal power source, a recording 30-day chart which if the unit is not operating, starts automatically every three days to record generator voltage, engine starting relays and time delays—all replaceable cartridge type.

Diesels Help Lay Pipeline



These 42,000-pound HD-19 crawlers help lay in part the 1,876 mile 242 million dollar Transcontinental Gas Line that will soon bring natural gas to the Middle Atlantic area. This biggest pipe line undertaking of all time will extend from the lower Rio Grande (Texas), to New York City. This particular operation is part of Schedule No. 5, a 100-mile stretch between Alexander City, Alabama, and Newnan, Georgia, contracted for by Midwestern Constructors. During the lowering in operation the HD-19's move into position about 150 feet apart alongside the pipeline. On signals from the foreman, the tractor boom and pipe move toward the ditch. Then in regulated order each tractor lowers a section of the connected pipe.

DIESEL PROGRESS

Bendix-Skinner

ORIGINATOR OF MICRONIC FILTRATION

the *Finest*

Way to Make
Liquids Come Clean



Nine times out of ten you'll get a better filtering job with **Bendix-Skinner** filters. No magic—just the simple fact that **Bendix-Skinner** has developed entirely new and exclusive filtering techniques in twenty years of tackling the tough jobs. We'll welcome an opportunity to prove it. An inquiry costs you nothing and may save you much.

Over 350 Models providing filtration from $\frac{1}{2}$ micron (.000019") upwards at flow rates from 1 to 5000 g.p.m.



Specify **YOUNG** FOR COMPLETE COOLING FROM A SINGLE SOURCE

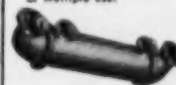


Pine line terminal station of the Union Oil Company of California at Avila, California, using Young Jacket Water Coolers and Heat Exchangers.

Integrated installations of several kinds of heat transfer equipment are common in Young Engineering experience. The Union Oil Company (see above) uses jacket water coolers to cool three 450 hp Diesels pumping up to 21,000 barrels per hr. The top half of each cooler handles the lube oil cooling water, the lower half cools the engine jacket water. A Young heat exchanger, rated to the job, cools the lubricating oil. Standard parts make possible quick delivery, economical maintenance. Find out if you're getting the most for your cooling dollar, mail coupon for full details.



Young Jacket Water Coolers, for gas, gasoline, or Diesel engines, available in many sizes for single or multiple use.



Young Shell and Road or removable Tube Bundle Heat Exchangers are made in single- or two-pass styles, stocked for quick delivery and economy.

YOUNG

Heat Transfer Products for Automotive and Industrial Applications.



Heating, Cooling, and Air Conditioning Products for Home and Industry.

YOUNG RADIATOR CO., Dept. 400-C, Racine, Wis.
Plants at Racine, Wisconsin and Matteson, Illinois

YOUNG RADIATOR COMPANY
Dept. 400-C, Racine, Wisconsin

I am interested in your combination cooling. Send me literature on both Jacket Water Coolers and Heat Exchangers.



Name _____

Company _____

Address _____

City _____

Phone _____

State _____

Diesel Speedster to Enter Indianapolis

A high speed diesel engine car was entered in the 500-mile automobile race to be run at the Indianapolis Motor Speedway May 30. The car, now under construction, was entered by the Cummins Engine Company. Jimmy Jackson, who has been in the money in the last four races, was nominated as the driver. The diesel speedster is described as a rear drive six-cylinder, four cycle, supercharged creation. It has piston displacement of 401 cubic inches, a bore of 4.125 inches and a stroke of 5 inches.

Bulletin on Diesel Battery Maintenance

The Gould Storage Battery Corp. announces an informative new three-page bulletin entitled "Instructions for Maintenance of Gould Batteries for Diesel Engine Cranking Service." The bulletin presents fourteen valuable battery maintenance procedures covering battery care from initial installation through complete charging operations. The first section lists five safety rules. The following section tells how properly to install batteries to prevent shifting. Other sections give valuable information on battery cleaning, compart-

ment ventilation, cell identification, and record keeping. The last section includes full instructions for setting the generator voltage so that the specific gravity of the electrolyte will be maintained at its full charge reading. The bulletin may be obtained by writing the Gould Storage Battery Corporation, Trenton, N. J.

General Manager of Lima Works

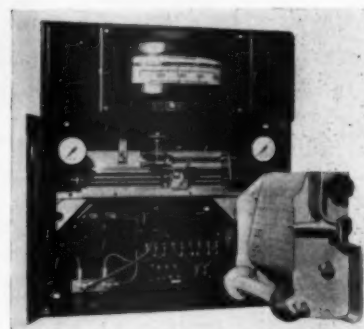
Alfred O. Weiland has been named general manager of the Lima Works, Lima-Hamilton Corporation, Lima, Ohio. Dan S. Ellis, president of Lima-Hamilton, has announced.



A. O. Weiland

During World War II Mr. Weiland was vice president and general manager of General Machinery Ordnance Corporation, Charleston, W. Va. He had previously been a partner in the George A. Houston Co., consulting engineers, New York, and prior to that vice president and general manager of the Baldwin Southwark Division of Baldwin Locomotive Company. Mr. Weiland was also vice president and general manager of RCA-Victor at Camden, New Jersey.

New Chart Recorder



The Wheelco Instruments Company announces the incorporation of a new air-operated strip chart recorder into their line of indicating, controlling and recording instruments.

With this new unit temperature, speed, flow, pressure, static grain loads, AC and/or DC volts, amperes, etc., can be measured easily with the flexibility, accuracy and simplicity of the Wheelco Capacilog electrical system. The control function is performed by the smooth floating power diaphragm motors connected to valves, dampers, levers, pistons, etc. The instrument will be known as the "Pneumatic Capacilog," is completely self-contained and has only two external air connections.

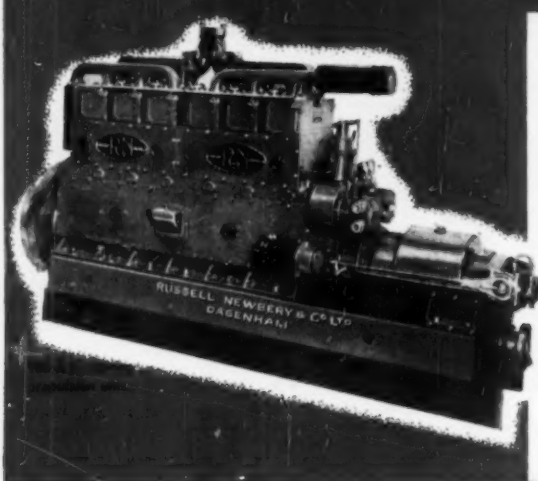
Diesel Engine Catalog is just off the press in its Fourteenth Edition. See the unique Diesel Horsepower Range Chart—invaluable aid to design engineers and buyers. ORDER COUPON ON PAGE 73.



DIESEL & DUAL-FUEL ENGINES

7 to 150 H.P.

Robustly designed for continuous service and ease of maintenance and backed by forty years' experience.



INDUSTRIAL

8 models 1-6 cylinders, 7 1/2 to 150 h.p. at 600 1000 r.p.m.
4 models 1-4 cylinders, 13 1/2 to 52 h.p. at 1500 r.p.m. (B.E.S.A. ratings.)
60-cycle A.C. or D.C. Generator
Sets up to 95 KW.

MARINE PROPULSION

8 models 2-6 cylinders, 18 1/2 to 150 h.p. at 1000 r.p.m.
4 models 2-4 cylinders, 22 1/2 to 48 h.p. at 1200 r.p.m.
3 models 2-4 cylinders 27 1/2 to 52 h.p. at 1500 r.p.m. (B.E.S.A. ratings.)

MARINE AUXILIARY

Generator, Pump and Compressor
Sets for Shipboard use—range as Industrial.

APPLICATIONS INVITED from firms in the U.S.A. interested in the possible distribution of our range of diesel engines. Stock and Credit Facilities available.

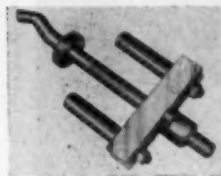
RUSSELL NEWBERY & CO., LTD.

ESSEX WORKS, DAGENHAM, ESSEX, ENGLAND. Cables: Diesel, Dagenham

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BRAZIL—LUPORINI COMERCIO E INDUSTRIA LDA, RIO DE JANEIRO

SEE OUR ADVERTISEMENT IN NEXT MONTH'S ISSUE

Pre-Cup Puller for International Diesels



The difficult service operation of pulling the pre-combustion cup can now be accomplished easily with a substantial saving of time by the

new OTC Pre-Cup Puller for all International Harvester diesel engines. The five forcing screws in the set are of the correct diameter and are angled correctly to fit the pre-cup hole from which the pull is made. Guide collars which fit in to the pre-cup over the forcing screw, center the screw and prevent its coming out when the cup is pulled. This new product is manufactured by the Owatonna Tool Co.

Chief Engineer for Pesco Products



D. M. Berges

Appointment of D. M. Berges as Chief Engineer was announced recently by R. J. Minshall, President of the Pesco Products Division of the Borg-Warner Corp. Mr. Berges' appointment fills a vacancy in the engineering department organization which has existed since J. A. Lauck's election as vice president in charge of engineering several months ago. In assuming his new position, Mr. Berges will be in charge of all the modern and extensive research facilities which are part of the new Pesco plant in Bedford Township, near Cleveland. Mr. Berges has been directly associated with the design, manufacture, and sale of aircraft accessories since 1931. He has served as chief engineer of Pesco's electrical section since 1943, when he joined the Pesco organization to supervise the establishment of a department for the production of direct current and special purpose electrical motors to be used with the company's line of hydraulic, fuel and fuel booster pumps for various installations.

Single Screw Towboat

Recent contracting going on by the St. Louis Shipbuilding & Steel Company is one for a single screw towboat with overall dimensions of 100x26x9 feet, and is to be driven by a General Motors 1200 horsepower diesel engine with a 3:1 reduction gear. A rather unique design of this towboat is that it is fitted with a raising and lowering pilot-house so that the boat can operate on the upper Illinois and Chicago area. A contra-guide steering rudder is also fitted and is also driven by the diesel engine.

New Chemical Feeder

A new chemical feeder that operated continuously with no extra attention in wet or dry oil fields has been announced by Manzel, Inc. The new chemical feeder has a built-in force feed lubrication systems that assures complete lubrication of the waste gas-driven motors, preventing the corrosion

that frequently causes stoppage and results in bad tanks of oil. It eliminates excessive manual labor formerly necessary in order to keep feeders constantly operating in wet gas fields.

The new Manzel Feeder is available with reciprocating or rotary drive gas motor, operating on as low as 3 lbs. pressure. It supplies any desired amount of chemical from one-half pint per hour up. Also available is a kit for conversion of present chemical feeders to force feed lubrication.

Orders for Diesel-Electric Locomotives

The Baldwin Locomotive Works has received an

order for eleven 1000-hp. diesel-electric switching locomotives, having a total approximate value of one million dollars, from the Missouri Pacific Railroad Company. Other orders received since January 1 include four 33,500-hp. hydraulic turbines received through Westinghouse Electric International Company valued at about one and one-quarter million dollars; one 750-hp. diesel-electric switching locomotive for the Warner Co.; one similar switching locomotive for the American Cyanamid Company; three 1,000-hp. switching locomotives for the Seaboard Air Line Railroad Co.; and two articulated, meter gauge, steam locomotives of the 2-6-6-2 type for the E de F Teresa Christina, Brazil.

MANY DIESEL OPERATORS SPECIFY THIS ONE DIESEL OIL . . .



Diesel operators can depend on D-X Diesel Motor Oil to stand up under the most severe operating conditions. It has unusually high resistance to heat, oxidation, sludge formation and corrosion. It's safe!

If you want better performance from your Diesels, investigate D-X Diesel Motor Oil. Mail coupon today for name of the D-X Distributor nearest you.



MID-CONTINENT PETROLEUM CORPORATION Tulsa 2, Oklahoma

Gentlemen: Send me information about D-X Diesel Motor Oil and the name of the nearest D-X Distributor.

Name

Address

City

State

Firm

Type of Diesel

THE SOFTEST JOB WE KNOW...

is maintaining a

FULTON ENGINE



Some users say we build 'em too well...

their maintenance men grow lazy. Who cares...when year after year the cost sheets show the engines with the lowest upkeep and fuel expense are:

FULTON IRON WORKS COMPANY

SAINT LOUIS 14, MISSOURI

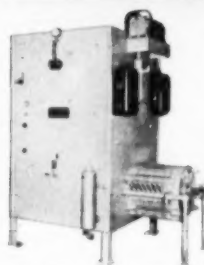
New York Office: 82 Wall Street, New York 5

FULTON DIESEL AND DUAL-FUEL ENGINES!
your best buy in the long run

FOR CLEAN OIL and
CLEAN ENGINES

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OIL PURIFICATION EQUIPMENT
PURIFIERS - FILTERS - RECLAIMERS - CONDITIONERS



AIRLINE OIL PURIFIER



HYFLOW OIL FILTERS



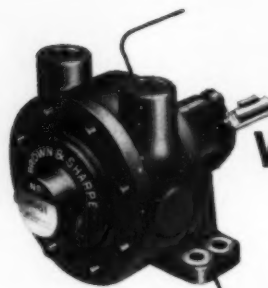
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There's a HILCO for every engine
lubrication and fuel oil Purifying Problem

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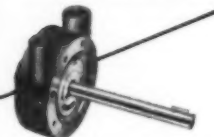
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IN 3 SIZES
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and Stripped Models,
with or without housings.



FOR LUBRICATION SYSTEMS on machines and mechanisms that reverse. Pumps maintain unidirectional delivery regardless of direction of shaft rotation. Other advantages: easy changeability of flow direction from one port to the other; 4 different positions of foot mounting; stripped models for integral mounting. Write for new Bulletin. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

We urge buying through the Distributor

BROWN & SHARPE B.S.

Ten Commandments for Diesel Maintenance

1. Thou shalt keep thine engine clean and in adjustment that thy life in its company shall be long and that the owner shall increase thy pay.
2. Know thine engine and all its parts and functions, else thou shalt be in some unholy spot.
3. Be not wise in thine own conceit. Remember the factory instructions and keep them holy, lest repairs be thine undoing.
4. Be not loose in thy jaw hinges for no man knoweth *all* about diesels. The truly wise absorbeth much knowledge and exceedeth little, and he who so doeth shall gain repute among his fellows and favors among his superiors.
5. For all things in this life that thou desirest thou shall pay plenty and also for the wisdom of experience; no less advice from the multitudes costeth nothing and is usually worth just that.
6. In the books thou mayest read *what* to do and *when*, but only the voice of experience may tell thee *why* and *how*, else thy reading of *what* and *when* shall but plague thee with smoke.
7. God maketh the earth to rotate endlessly without bearings or oil, but not thy diesel.
8. Curse not thine engine when it turneth not. Curse rather thine own stupidity.
9. Steam engines and gas engines may long turn over though sloppy; a diesel not so. With gauges and mikes be thou ever busy.
10. The eternal eye watcheth universal operations, but thou shalt not rely upon it as to thy diesel. Thine own vigilance is the price thou payest for thy job.

Editor's Note: The above Commandments were contributed by the Cummins Engine Company.

Orders for More Diesel-Electrics

The New York Central System announced recently orders totaling \$14,500,000 for 133 yard and road switching diesel-electric locomotives and four units of road passenger diesel-electric power, totaling 137 units of power. The newly-ordered diesel-electrics, totaling 136,000 horsepower, will bring the total diesel-electric horsepower of the New York Central and affiliated railroads to 1,117,000, comprising 998 units of power.

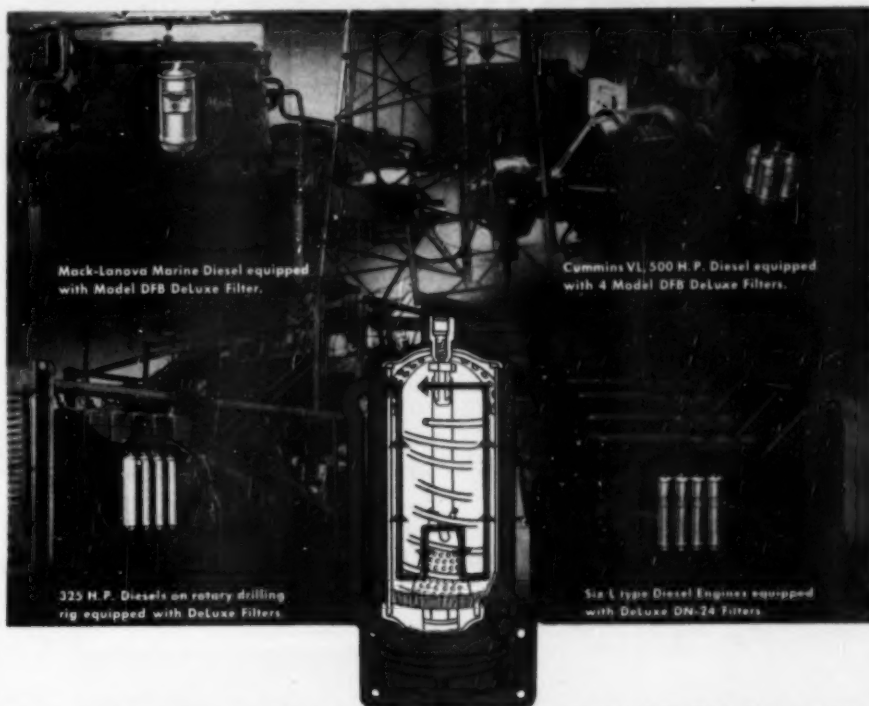
The four units of road passenger power, which will make a total of 72 such units pulling leading passenger trains on the Central's System, will be used in through service on the Boston & Albany Railroad between Boston and Chicago and St. Louis. The units, all "A" type, will be specially equipped with dynamic brakes, by which the motors will assist in braking the train on the grades of the Berkshire Mountains in Massachusetts.

The locomotives will be constructed by the Electro-Motive Division of General Motors Corp.; the American Locomotive Co.; Fairbanks, Morse & Co.; and Lima-Hamilton Corp. Orders placed

with each manufacturer follow: Electro-Motive Division: Twelve 1,500-hp. road switchers; six 1,200-hp. yard switchers; eighteen 1,000-hp. yard switchers; two 800-hp. yard switchers; twelve 600-hp. yard switchers. (Twenty-four 1,200-hp. yard switchers were ordered last year from the Electro-Motive Division for the affiliated Indiana Harbor Belt Railroad as a previously-announced part of this order.) American Locomotive Co.: Four 2,250-hp. road passenger "A" units; eight 1,500-hp. road switchers; nineteen 1,000-hp. yard switchers; thirty 600-hp. yard switchers. Lima-Hamilton Corp.: Sixteen 1,000-hp. road switchers. Fairbanks, Morse & Co.: Ten 1,000-hp. switchers.

National Bearing Expanding Its Line

National Bearing Division of American Brake Shoe Company announces an expanded line of cored and solid "Tiger" Bronze bars in all popular sizes, both rough and machined. Complete stocks are now available for immediate delivery from plants in Meadville, Pennsylvania; St. Louis, Missouri, and Chicago, Illinois. A six-page bulletin, listing sizes and weights of these bars, shows the physical properties of "Tiger" Bronze and describes the many uses and advantages of this exceptionally wear and shock resistant, anti-frictional material.



Get LONGER Diesel Engine LIFE and LOWER MAINTENANCE COSTS with DELUXE FULL-DEPTH Filtration!

Longer Oil Travel is the Secret of DeLuxe's Thorough Oil Cleansing Principle!

Operators of mobile and stationary diesel engines have enjoyed the benefits of DeLuxe's Full-Depth Filtration Action for over 15 years. The Full-Depth Principle is so basically sound, so simple, that once pointed out it is easy to appreciate the reasons for DeLuxe's outstanding performance.

LONG OIL TRAVEL from bottom to top—the entire length of the filter, instead of the conventional **center to side SHORT OIL TRAVEL** is essential to thorough oil cleansing. With every DeLuxe Filter you get **FULL-DEPTH FILTRATION** plus these 3 exclusive DeLuxe Advantages:

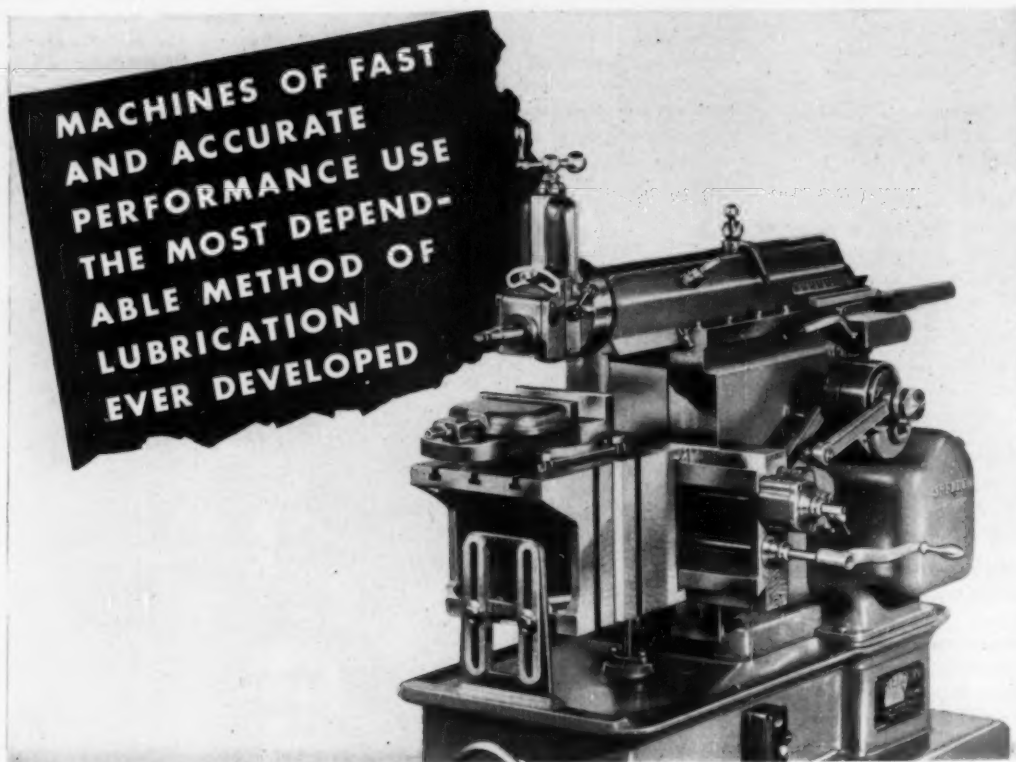
1. A patented Spring built into the cartridge that assures uniform density—prevents cartridge collapse under engine pressures.
2. The exclusive metal Cone that insures correct, uniform rate of oil flow—drops heavy particles into the sump.
3. The new, removable Sedisump that collects dirt, water and sludge—makes sump cleaning quick, easy and clean.

Proof that the DeLuxe Principle of Full-Depth Filtration actually does the job *right* is the fact that year after year, 75% to 90% of the Winners of Bus Transportation Maintenance Awards go to DeLuxe users. Last year 15 out of 18 Award Winners were DeLuxe Equipped.

For valuable information on the care and maintenance of all filter-equipped engines, write for your free copy of the "Key to Clean Lubrication".

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DELUXE
Oil Filter
FOLDS MORE THAN STRIPS TO—MORE THAN FILTS OIL
ACTUALLY CLEANSES OIL



**MACHINES OF FAST
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PERFORMANCE USE
THE MOST DEPEND-
ABLE METHOD OF
LUBRICATION
EVER DEVELOPED**

MADISON-KIPP *Fresh Oil* **BY THE MEASURED DROP**



On the Sheldon 12" Back Geared Shaper insures dependable lubrication to the important bearings including the ways. There are Madison-Kipp Lubricators for original standard equipment for almost every type of machine tools, work engines, and compressors.

MADISON-KIPP CORPORATION

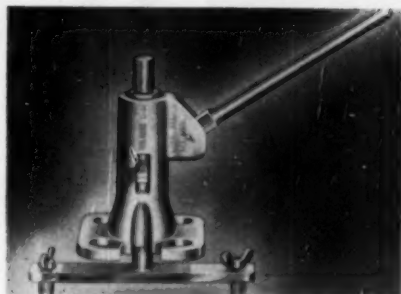
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Diesel Valve Spring Depressor



The new Safe-N-Ezy Diesel Valve Spring Depressor for EMC 567 and 567A diesels is a real labor saver, according to its maker, Patxon Diesel Engineering Company. In contrast to previous Diesel Valve Spring Depressors, the new model D-14 depresses four springs simultaneously. Earlier models for the EMD 567 diesels accommodate only a single spring at a time.

The new model D-14 Depressor is compact, lightweight, rugged, designed for one-man operation. It included a Stud with a Base Plate having wing bolts for quick attachment to the head. Compressing the springs to the desired point, the tool safely holds them in position, leaving the mechanics' hands free to proceed with the work. A simple, safe, easily operated device controls the release of the depressor.

Diesel Drive for Mine Work



All equipment in the deep mine being worked by the Bradford Coal Company in the soft coal fields near Bigler, Pa., has been operated by diesel-electric engines since July, 1948. At that time two super-charged Cummins diesels turning at 1,350 rpm. were installed to drive a 275-kw. generating set. The equipment powered includes seven hoists, two cutting machines, two mine locomotives, and one fan. The generating set also furnishes all electricity for all the electric lights used in the mine and adjacent buildings. The president of the coal company reports that each of the Cummins diesels operates on 2.21 gallons of diesel fuel an hour, and that in 14 months of operation the two engines have incurred no maintenance expense.

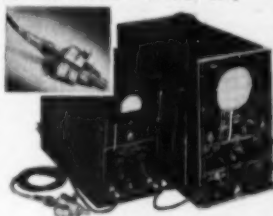


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Your requirements are immediately and carefully met by our staff of trained technicians operating our own modern equipped plant and laboratory. Improved production methods and facilities enable us to provide you with a more systematized and complete operation. Products are constantly being created, developed and tested to offer you the latest and best in electronic equipment.

DYNAMIC MICROMETER Measures Dynamic or Static Displacement, Vibration or Movement

The only accurate electronic instrument available for measuring radial displacement, static distance, dynamic movement, and also other eccentricities of rotating or vibrating metal objects. Measurements are made without any physical contact between the sensing unit and the object. No calibration necessary, as the sensing unit is a standard micrometer head calibrated directly in divisions of 1/10,000 inch. Measurements are independent of acceleration or speed of rotation. Not only measures static distance, but amplitude of dynamic movement down to .0001 inch. Guaranteed accuracy, .0002 inch.



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GRIND THEM TRUER-
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DIESEL TYPE
Valve Seat GRINDER

Model EDP Diesel Type Eccentric Valve Seat Grinder. Range of surface seats: 2 1/2 to 6 1/2". Equipped with two grinding wheel adapters.



Engine performance is improved and stays improved for longer periods. Fuel economy is renewed. Valve seat grinding takes less time, and it's done right. These are the advantages of the Waterbury-Hall Valve Seat Grinder. Any mechanic can use it to produce a factory true job. Manhours mean more with



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WATERBURY TOOL DIVISION

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DIESEL ENGINE



VOLUME 14
1949 EDITION
JUST OFF
THE PRESS.

\$10 PER COPY

REVISED ANNUALLY.

This comprehensive book is brought up-to-date every year. Carefully revised and checked by the manufacturers themselves, its complete and profusely illustrated data include numerous changes, new types and models and re-designs with up-to-the-minute information on diesel and dual-fuel engines manufactured in this country.

Design and Consulting Engineers keep Diesel Engine Catalog at hand for easy reference throughout the year.

Product Engineers find its accurate, easy-to-find data of great value.

Engine operators use its wealth of factual information as an invaluable aid to good maintenance and service.

Technical Instructors and Students consult it as an unsurpassed reference book.

DIESEL ENGINE CATALOG

The following are manufacturers whose engines are fully described with tabulated specifications:

American Locomotive Company
Atlas Imperial Diesel Engine Co.
Baldwin Locomotive Works
Buckeye Machine Co.
The Buda Engine Co.
Burmeister & Wain
Caterpillar Tractor Co.
Chicago Pneumatic Tool Co.
Clark Brothers Co., Inc.
Consolidated Diesel-Electric Corp.
Continental Motors Corp.
Cooper Bessemer Corp.
Crofton Diesel Engine Co., Inc.
Cummins Engine Co., Inc.
Enterprise Engine & Foundry Co.
Fairbanks, Morse & Co.
Flagship Engine Co.
Fulton Iron Works Co., Inc.

Generals Motors Corp.
Cleveland Diesel Eng. Div.
Detroit Diesel Engine Div.
Electro-Motive Div.
Gray Marine Motor Co.
Hallett Manufacturing Co.
Harnischfeger Corp.,
P & H Diesel
Hercules Motors Corp.
Hill Diesel Engine Co.
Div. of Drake America Corp.
Ingersoll-Rand Co.
International Harvester Co.
Kermath Manufacturing Co.
The Lathrop Engine Co.
Lima Hamilton Corp.
Lister-Blackstone, Inc.
Mack Manufacturing Corp.
Mechanical Equipment Co.
Murphy Diesel Co.

National Supply Co.
Nordberg Manufacturing Co.
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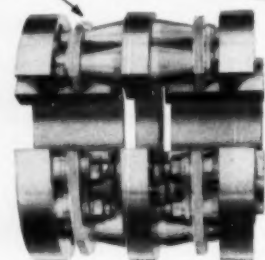
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Baldwin Opens New Parts Storeroom

The Baldwin Locomotive Works has announced the opening of a new diesel locomotive parts storeroom at Houston, Texas. The new storeroom, which will start to function about February 1, will enable Baldwin to offer more direct and speedy service on diesel engine and locomotive spare and replacement parts to customers in the states of Texas and Louisiana formerly served from the Baldwin storeroom at St. Louis.

Some 1,500 separate and distinct items of diesel engine and locomotive parts will be stocked, ranging from gaskets worth only a few cents, to other major diesel engine and locomotive components valued at several hundred dollars cash. William A. McKnight, district manager for Baldwin, is in charge of the new storeroom and is the point of contact for those desiring to avail themselves of its services.

Caterpillar Tractor States 1949 Profit

Caterpillar Tractor Company's 1949 sales have exceeded the previous year's sales by 36 million dollars and have set an all-time high record, according to the company's recently released annual report, signed by President Louis B. Neumiller. Profit for the year amounted to \$18,834,787, or 7.30 per cent of the sales volume, an increase of more than five million dollars over 1948 earnings. Dividends paid during the year totaled \$7,010,757, consisting of \$6,587,840 on common stock and \$422,917 on preferred stock. The sales outlook continues to be generally favorable. During all of 1949 prices in U. S. dollars of Caterpillar products were stable and costs, taxes, government fiscal practices, and other pertinent factors all indicates that such prices are not likely to fall below present levels in the near future.

New Electronic Timer

The Herman H. Sticht Co., Inc., has recently been appointed sole U. S. A. representatives for the firm of Electronics Instruments Ltd., Richmond, Surrey, England, and announces the distribution on the American market of the new Chronotest Electronic Millisecond Timer, an instrument which is designed for the measuring of short time intervals between 0.1 and 10,000 milliseconds with an accuracy of 1 to 2 per cent. Two models are available, one with a top range of 1 second in six steps and one with a top range of 10 seconds in six steps. The instrument operates from line voltages of 110-250 volts AC, 40-100 cycles single phase. Readings are obtained on a large 6-inch indicating meter with an easy to read scale approximately 4½ inches long. The basic principal of the instrument is a variant of the well known condenser charging circuit incorporating refinements and safeguards which several years of development has shown to be desirable. Bulletin may be had upon request.

Diesel Engine Catalog is just off the press in its Fourteenth Edition. See the unique Diesel Horsepower Range Chart—invaluable aid to design engineers and buyers. ORDER COUPON ON PAGE 73.

Overhaul Savings With Diesel



Sand, gravel, oil—or bonts—they're all the same to this Cummins-powered Sterling operated by Henry Nelson Co., Natick, Mass. The tractor was purchased in 1947, now has about 200,000 miles on it and has had one overhaul at 150,000 miles. Mr. Nelson said that complete engine overhaul cost for the diesel was \$350, that the cost for a similar gasoline engine overhaul would have run over \$800. The Cummins averages approximately seven miles per gallon as compared with three and four miles per gallon in a gasoline-powered rig hauling the same load.

Cutting Time and Costs With Diesel

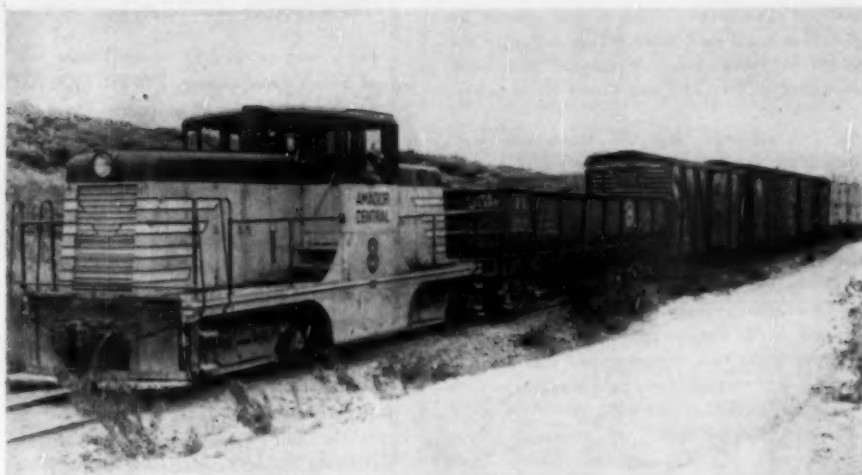


Novel tools were used to cut time and costs when Evans & James, of Little Rock, Ark., laid a 382-mile 10-inch line for Atlantic Pipeline Company, a job begun last spring and finished in fall. One innovation, shown above, was cleaning and doping in a single operation. The cleaning unit powered by an International diesel engine spread the dope on cleaned pipe by pulling a burlap sleeve as it moved forward. An International diesel crawler with Superior side boom cradled the pipe.



Another new tool used by the Evans & James spread was the above experimental pipe-bending boom, designed and constructed by welding foreman J. C. Davis, of Tulsa. Built on a basic Superior unit, it is mounted on an International diesel crawler. The special boom, put on the job as seen here before Davis had completed its development, will have four cables for easier handling of long pipe lengths.

Diesel-Electric Saves Money



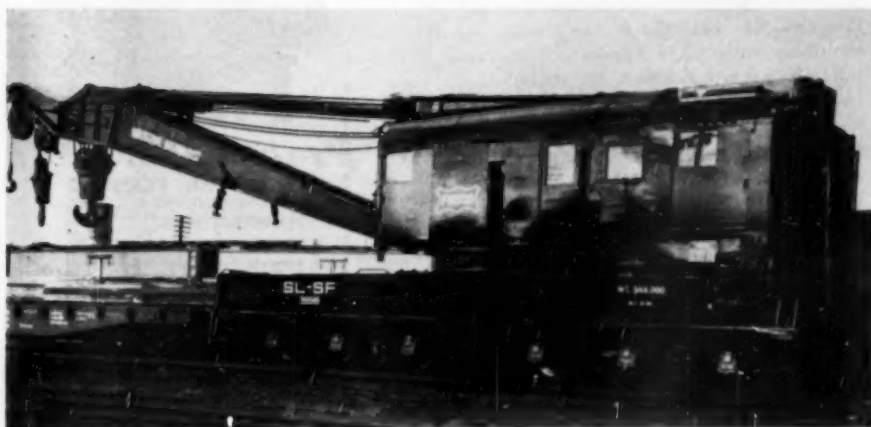
An estimated saving of better than \$3.25 an hour has resulted from use of a 44-ton diesel-electric locomotive operating over the "billy goat" profile of the Amador Central Railroad in California. The figure was estimated as the result of a comparison made recently by the Amador Central when it was necessary to substitute an old steam locomotive for the American Locomotive-General Electric diesel-electric. The unit was shopped for a week to have its wheels turned and minor repair work done, a routine procedure. The steamer was put back into service during this time. A cost breakdown for 1948 showed that the Alco-GE unit's cost was an average of \$2.03 per hour with operator. When the steamer was retired in 1944, the average cost per hour for it was \$4.755. The saving has been realized despite an estimated increase of 30 per cent in cost of operation of this

diesel-electric locomotive between 1944 and 1948.

The Amador Central Railroad stretches into the Sierras of California between Ione and Martell. Although only 12 miles long, the road has 100 curves, a four per cent grade, an elevation rise of 1,100 feet and twelve bridges and trestles giving it a "billy goat" profile.

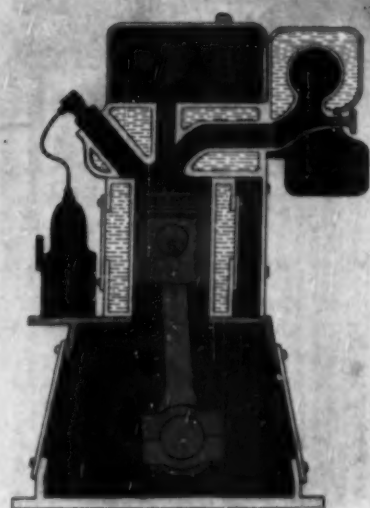
The diesel-electric has been in service for 4½ years. Geared for 20 mph., the unit makes at least one round trip a day, sometimes two. Taking nearly two hours each day, the locomotive hauls lumber, clay, brick, petroleum products and wood chips. The inflammable nature of many of its loads makes the diesel-electric particularly favored over the spark-throwing steamer that was formerly used.

Diesel Driven Derrick



The Frisco Railway has received delivery on a 250-ton diesel-driven derrick, manufactured by the Industrial Brownhoist Corporation of Bay City, Michigan. The Frisco derrick is the second one of that size ever produced by the company, and replaces a 160-ton derrick. The new unit will be stationed at Springfield, Missouri. It is of the

fluid drive, self-propelling type, and weighs 388,000 pounds, and is fitted with two 275 horsepower diesel engines, each of which is capable of lifting 250 tons. By using both engines the speed of lift is increased. The derrick is equipped with three hooks for loads of different weight, and overall length of the car is 39 feet.



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DID you know you can remove lime-scale and rust accumulations from the water-sides of your Diesel jacket water coolers and other heat exchange units without dismantling equipment? It's a fact when you use Oakite Compound No. 32!

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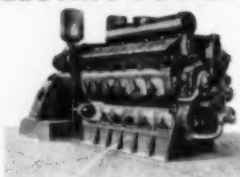
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SOUTHERN PACIFIC

... Continued from Page 42 ...

matched against the millions of gtm.'s hauled by S.P. in a single week make it easy to justify the enormous initial diesel investment and early scrapping of even half way decent steam power.

On the passenger side the train mile cost, including repairs, for the same period, was \$2.558 per train mile for power with steam and \$1.832 per train mile with diesel. Obviously the striking savings with diesel apply more to road freight than they do with road passenger, due to high heating and auxiliary power requirements and train crew expense, and all the trappings that go with diesel. But the passenger train gtm. cost exclusively for fuel, enginemen and trainmen, engine house, supplies and train supplies and expense was still \$2.13 per 1,000 gtm.'s for steam and only \$1.28 for diesel!

While the Southern Pacific has laid out a broad, comprehensive program for the next ten years on its motive power program, certain immutable laws of economics are, from this editorial viewpoint, bound to overtake and speed up the entire program, if not drastically change it in many ways. The coach fare base of the Daylight streamliners has now dropped actually below the level of the vast competing Greyhound bus network fares. Whole new levels of passenger revenue have been tapped. A diesel streamliner, if run right, can literally take hundreds of automobiles off the highways overnight, especially those thousands who weary of repeat trips over the same routes. Diesel freight speeds are making it tough for trucks. Truck costs are rising faster than rail costs. Population in the S.P. territory keeps on bulging. Mail and express rates on the railroads are bound to be increased. Three-quarters of the entire S.P. system lends itself perfectly to diesel operation. We predict that within not ten, but FIVE years, the entire Shasta Route, including the Cascade and Siskiyou lines; the Klamath Falls cut-off to the main line east of Reno, the Coast Line from San Francisco to Los Angeles, and everything between Los Angeles and El Paso, will be 100 per cent dieselized. The steam holdout territory will be the San Joaquin Valley, the Sierra Nevada crossing where water, grades and facilities permit economical operation of the A-C Backups, and the Texas country where steam can use the level, straight track network to advantage. Curve rail wear alone will pay six per cent return to the diesel side of the ledger in 1,000 miles of the S.P.'s mountain and 4,000 miles of semi-mountain regions. Diesels keep the track smooth everywhere. The Southern Pacific has more bad curves than any Western system. So it will be wise to watch the Southern Pacific between now and 1955 . . . not 1960!

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An improved high pressure seal, designed to meet the extraordinary sealing requirements of equipment handling hydrocarbons under high pressures and temperatures, is announced by the Felt Products Manufacturing Company, Packing Division, Chicago, Illinois.

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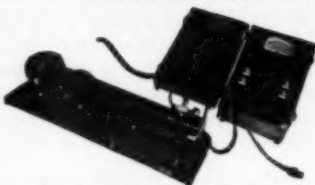
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The new Fel-Pro Type H-P Seal incorporates three major improvements, which according to the manufacturer assure complete sealing with longer equipment life, trouble-free operation and minimum maintenance costs. D. B. Grasett, manager of the Packing Division, states that the three major improvements are: first, improved control and balance of hydraulic pressures to eliminate the problem of excessive sealing face wear; second, a reduction in the number of parts susceptible to wear and deterioration which minimizes operation and maintenance; third, a simplified cooling method eliminates need for auxiliary cooling systems.

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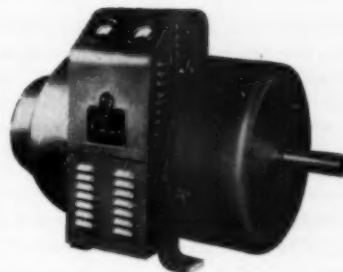
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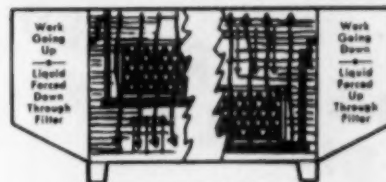
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WEST COAST DIESEL NEWS

By FRED M. BURT

NEW 65-foot crab fishing boat, *Margaret E.*, built at the Siletz Boat Works for Bert Erickson, Newport, Oregon, for use in winter fishing out of Yaquina Bay, is powered with a 150-hp. Lorimer diesel.

FOR use in Gulf of California shrimp industry by Productos Congelados, Guayamas, Mexico, headed by Hernando DeCima, mother ship *Ma-honing*, a 115-foot, converted naval vessel, is powered with a couple of "Caterpillar" diesels, with the Baker refrigeration system operated through a pair of 40-kw. G.M. diesel-generating sets.

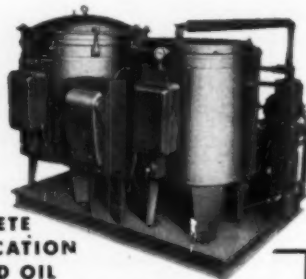
PURCHASED by A. F. Aggen, Camarillo, Calif., for irrigation purposes, a Superior 160-hp. at 600 rpm. natural gas engine, direct connected to a deep well turbine pump through a 1 1/2:1 gear ratio, Farrell-Birmingham right angle gear head.

FOR Ralph Osterode's Albacore boat, *Kathy Ann*, San Diego, a new 2-cyl. 40-hp. G.M. diesel generating auxiliary set supplied by Crofton Diesel Engine Co., San Diego.

THE 72-foot *Brooks Bay*, British Columbia halibut owned by Canadian Fishing Co., is one of the first boats to be powered with one of the new series "Caterpillar" diesels, with rated output of 234-hp., the 8-cylinder engine drives through a Twin Disc reverse and reduction gear.

POWERED with a 6-cylinder 465-hp. Superior diesel, with General Motors diesel auxiliaries, the 103-foot tuna clipper *Hortensia Bertin* was recently launched by the Tacoma Boat Building Co. for owner, Capt. O. E. Bertin, Santa Monica. The boat was designed by Arthur DeFever, of the firm of Wilvers and DeFever, San Pedro.

POWERED with a 120-hp. "Caterpillar" diesel supplied by N. C. Marine, distributors for Puget Sound, the 57-foot *Nancy Rose*, an Alaska limit seiner, has a 3:1 Western reverse and reduction gear and a Twin Disc power take-off. Built at the Bellingham (Wash.) Shipyards for the Tarabochia brothers, Nick, Joe and John.



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U. S. HOFFMAN
MACHINERY CORPORATION
FILTRATION DIVISION, 292 LAMSON ST., SYRACUSE 6, N. Y.

TO BE used for irrigation purposes by the Garlow Farms, Bakersfield, Calif., a Superior diesel, 280-hp. at 900 rpm., direct connected to a deep well turbine pump through a 2:1 right angle gear head.

NICK LANE, formerly with the Atlas Imperial Engine Co., Oakland, has been appointed manager of the Fort Bragg, Calif., branch of West Coast Engine & Equipment Co., Berkeley, Northern California, distributors of General Motors diesels, taking the place of the late Jerry Steves.

ELECTED president of the Fishermen's Cooperative Association for 1950 was Tony Barcott, Everett, Wash. (skipper of purse seiner *Coral Sea*, powered with a 240-hp. Washington diesel); John Zankia (*Vittoria*), 1949 president, becomes vice president; and Slavko Ivancic (*Adriatic*) remains as treasurer. John Real, San Pedro attorney, is acting as temporary manager.

FOR installation in his 36-foot combination boat, Frank Mercurio, Monterey, purchased a "Caterpillar" D3400 diesel from Thomas A. Short Co., San Francisco.


CUMMINS diesel new engines sold and/or serviced during January by Cummins Service & Sales, Los Angeles, for Peterbilt, Kenworth, Sterling, Autocar, and LeTourneau truck or tractor units, a total of 29 engines of 150, 165, 200 and 275 hp.

MADE by Hathaway Company, Santa Fe Springs, Calif., for oil well drilling to power a Wilson Draw Works, the first installation of the new model "Caterpillar" V-12, 500-hp. at 1,200 rpm. diesels; two units purchased from Shepherd Tractor & Equipment Co., Los Angeles.

A FORMER 160-foot LCI, now freight and passenger boat, *Yellowknife Expediter*, was converted at a cost of \$63,000 at Victoria (B.C.) Machinery Depot, with two new 600-hp. Cooper-Bessemer diesels for repowering twin shaft propulsion, followed by a 5,500-mile voyage to Great Slave Lake, where she will operate.

TO SUPPLY power for small motors used in pumping oil in the Continental Oil Co.'s Wyoming field, three 180-hp. Clark Bros. natural gas en-

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gines (with one more to follow) driving 125-kw. generators, have recently been installed. In a lean-to on the powerhouse Engineering Controls' Vapor Phase installations take heat from engines for steam in coils. In cold weather (to -35°F.) three blowers pull air across blowers to heat power house; in hot weather they exhaust hot air in reverse movement.

FOR repowering, a new Buda supercharged, 219-hp. diesel with 3:1 Twin Disc reduction gear, was recently installed in *Wallace Foss*, a 63-foot tug, one of the most economical vessels in the Foss Launch & Tug Co., Seattle fleet. This company also purchased The Belling Tug & Barge Co., with one steam and five diesel tugs.

A NEW 52-foot seiner designed by Walter C. Howell, Bellingham, Wash., for Jas. E. Scott, Metlakatla, Alaska, will carry 870 gals. of diesel oil to supply the 165-hp. Gray marine propulsion diesel for a top speed of 9.8 knots.

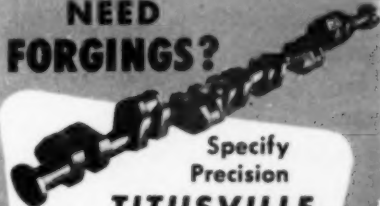
INSTALLATIONS of Washington marine diesels in recent months include an 8-cylinder, 440-hp. unit for the Barbour-Hallett tug, built for Columbia River service by the Tacoma Boat Bldg. Co., and a 6-cylinder, 300-hp. Washington diesel for U. S. Fish & Wildlife Service vessel, *John F. Manning*.

AN army air-sea rescue boat, 104 feet long, converted to a luxurious pleasure boat at Fulton Shipyards, Antioch, Calif., for R. A. Bernot, Mexico City, is powered for propulsion by twin G.M. Detroit diesels, each of 400-hp.; for trolling speed, a single 225-hp. G.M. diesel with 1½:1 Twin Disc reduction gear; auxiliary power from two 20-kw. G.M. diesel electric sets.

TO MAKE a total of 14 towboats, the latest addition to the Island Tug & Barge Co., Victoria, B. C., towing fleet is the *Inland Dispatcher*, formerly the U. S. boat *Almara*; completely reconditioned and re-powered with a 320-hp. Atlas Imperial diesel.

BUILT by David Scott at his Mitchell Island boatyard on the Fraser River, the 57-foot Albacore fishing vessel *Tauranga*, the first vessel to be built in British Columbia specifically for Albacore fishing, is powered with a 165-hp. Gray diesel.

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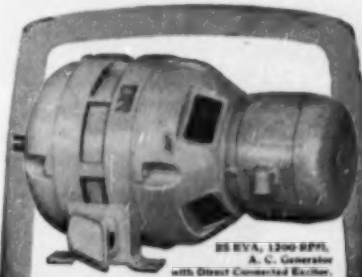
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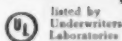
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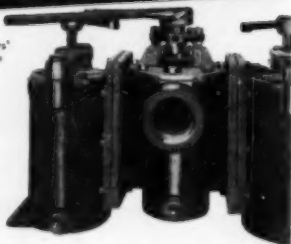
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